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ABSTRACT

Reported is a study of the process of bargaining and bargaining impasse to see what relationships exist between the phenomena and faculty and student attitudes toward the process itself, faculty strikes, teaching and learning under such conditions, and affective course goals in biology. The research was conducted by means of a nine-page opinionnaire. Data were obtained from faculty and students at two community colleges. Students (n=560) were those enrolled in an introductory general education course in biology. The faculty sample comprised 15 members. Faculty data were analyzed by Clyde MANOVA one-way multivariate and univariate analysis of variance for F-ratios, group means and standard deviations. Student data were analyzed by Clyde MANOVA, 2 x 2, two way multivariate and univariate analysis of variance, factor analysis and correlational matrix, and a stepwise regression analysis. All faculty from the impasse and non-impasse conditions were positive in their attitudes toward collective bargaining in terms of the bargaining process, sanction activities and the use of strikes. They differed in their attitude toward bargaining impasse. Student attitudes toward collective bargaining in general were positive but neutral toward sanctions and use of strikes. (Author/EB)

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A STUDY OF THE RELATIONSHIP BETWEEN COLLECTIVE BARGAINING IMPASSE AND THE ATTITUDES AND PERFORMANCE OF BIOLOGY INSTRUCTORS AND BIOLOGY STUDENTS IN TWO URBAN COMMUNITY COLLEGES IN MICHIGAN

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

By

Edwin Arthur Arnfield, A.B., M.Ed.

* * * * *

The Ohio State University

1974

Reading Committee:

Dr. Virgil Blanke
Dr. Robert Steiner
Dr. Arthur White

Approved by

Arthur L. White

Advisor
Department of Education

SE 018 819

VITA

February 12, 1934	Born - Lawrence, Massachusetts
1957	A.B., Biology, Wayne State University, Detroit, Michigan
1963	M.Ed., Science Education, Wayne State University, Detroit, Michigan
1965-66	Research Associate and Director, Autodidactic Laboratory, College of Medicine and University Hospital, The Ohio State University, Columbus, Ohio
1966-1974	Professor of Biology, Department of Mathematics and Science, South Campus, Macomb County Community College, Warren, Michigan

FIELDS OF STUDY

Major Field: Science Education

Professor Robert Steiner

Professor Arthur White

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CHAPTER I

INTRODUCTION

Need for the Study

The decade of the 1960's saw the emergence in higher education of a new phenomenon known as collective bargaining, an adversary procedure for achievement of work contracts for faculty in institutions of higher education such as colleges and universities, and junior and community colleges. This process, which culminates with agreement upon a written contract that regulates a vast number of faculty procedures and activities, can become potentially injurious to all parties concerned when the discussion processes of collective bargaining break down, as they frequently do with resultant work stoppages and impasses. Such an impasse occurred in Autumn, 1972, at Macomb County Community College in Warren and Mt. Clemens, Michigan. Macomb County Community College and the Macomb County Community College Faculty Organization, representing the Macomb faculty as bargaining agent, began contract negotiations in March, 1972. Those negotiations did not result in a signed and ratified contract until January, 1973. Negotiations were often interrupted. Slow progress was made in negotiations until mid-August when a recess occurred. When both sides returned to the bargaining table as the September 8th school opening approached, they became hopelessly deadlocked. All efforts at successful contract conclusion failed and after late night sessions, bargaining broke down. On the morning of

September 8, the faculty met and voted nearly unanimously to strike. Both campuses were closed down and picketed for fourteen working days during which mediation failed and the Board of Trustees went to Circuit Court in Macomb County to get a temporary injunction against the striking faculty to force them to return to work. The faculty voted reluctantly to return to work and the judge ordered round-the-clock bargaining to take place until a contract agreement was reached. Not one class had been taught for nearly a month. Bargaining broke down again and from October to the middle of December, prior to holiday recess, no real bargaining took place, even though the sides did meet.

In the interim the faculty shifted its efforts toward an election of the Board of Trustees in November. Four of the seven members of the Board were up for election and after a county-wide campaign the faculty covered 80% of the county voting precincts on election day and elected three of the four candidates they supported to office. The new board would not take office until January, and the old board refused to accommodate the situation and the impasse continued into December when a break-through occurred and a tentative agreement was reached at the holiday break. The new contract was ratified by the faculty in early January ending ten months of continuous and often fruitless effort to agree.

Before one can understand the influences such bargaining situations and procedures can have upon biology teaching and biology teachers, one needs to know something about the nature of higher education, especially at the community college level; the nature of the goals and objectives of undergraduate science teaching, as well as some current trends; have some idea of the difficulties facing such biology instructors, especially in the field of instruction; and then take a look at how collective bargaining has helped to solve these difficulties, yet has caused some serious problems itself in the process.

The Community College and its Goals

There are 2,793 instructors of biology listed as teaching the subject in 912 institutions listed in the American Association of Junior Colleges Directory for 1968 (Fibel, 1969). Community colleges, or junior colleges, or community-junior colleges, the terms being virtually synonymous, are institutions controlled or at least partially supported by financing from one of the levels of the state governments (Crawfurd, 1970). They usually have a commonality of purpose. The five purposes generally assigned to these institutions are: providing general education for all students, providing organized occupational programs for students who will seek to enter employment immediately upon leaving the local college, offering transfer and college parallel courses in the pre-professional fields and in the arts and sciences, offering adult and community-service programs of a wide variety, and providing a full program of student personnel and counseling services for the students enrolled (The Community College in Michigan. Staff Study No. 1, 1957).

Community College Biology

The goals of biological education which are applicable to the community college have been recently stated by Cox (1971) as: the production of students who can demonstrate mastery of a given body of biological information and of certain biologically related manipulative skills; the development of a student with the ability to interpret and use biological information through first-hand experiences with the processes of biology; the development in the student of the ability to learn independently; an appreciation for the processes of biology; and the fostering of open-mindedness, a goal necessary to the perpetuation of a free democratic society. These goals can be traced historically to several important sources. The various Yearbooks of the National Society for the Study of Education have dealt extensively with such goals. Three such Yearbooks have devoted themselves exclusively to such general education in science (31st Yearbook, 1932; 46th Yearbook, 1947; 59th Yearbook, 1960).

Educational Objectives in Biology

Bloom and others in the 1950's began an exhaustive project to quantify educational objectives in both the cognitive and affective domains, intending the process to be a classification of the goals of educational systems (Bloom, 1956; Krathwohl, Bloom and Masia, 1956). The cognitive domain dealt with those objectives which concerned the recall or recognition of knowledge and the subsequent development of intellectual abilities and skills such as application, analysis, synthesis and evaluation. The affective domain dealt primarily with positive values, the categories being receiving, responding, valuing, organization and characterization by a value complex. These varied categories are the base upon which various goals and objectives in biology are constructed.

A brief listing of some attitudinal goals in biology would include: an appreciation of the processes of biology, the fostering of openmindedness, the valuing of logical reasoning, an appreciation of scientific attitudes, the acquisition of attitudes, interests and appreciations about science. Biology instructors have traditionally placed more emphasis upon objectives in the cognitive domain rather than in the affective because the latter are difficult to define and slow to be acquired while cognitive goals have been more easily defined and tested (Cox, 1971). Others who have published work in this area include Diederich, 1969; Haney, 1971; Butler, 1967; and Eiss and Harbeck, 1969.

Problems of Community College Biologists

In the last decade the interest of many national groups has centered upon the problems of community college biologists. The American Association for the Advancement of Science, the American Institute of Biological Sciences, the National Science Foundation, the National Science Teachers Association, the National Association of Biology Teachers, and the Commission on Undergraduate Education in the Biological Sciences have all focused attention on the two-year college biologist. Recent proposals for curriculum change have supported the course of the future as an interdisciplinary approach, giving a maximum of flexibility to students, and evolving a changing concept of the biology laboratory (Blazier, 1971). The curriculum today is still composed of four major components in the typical two-year college curriculum: a transfer curriculum which is part of a typical general education program; a terminal occupational curriculum, with the biological sciences an integral part of many of these programs; courses for the disadvantaged, with rarely a course in biology utilized, and; adult education programs including a variety of courses in the biological sciences. The curriculum is primarily student centered. Gunstream (1971) finds the vast majority of two-year college biologists hard working and dedicated people; but, they often find themselves working against insurmountable odds. The problems of excessive teaching loads and inadequate technical and secretarial assistance take their toll of the instructor's time and energy. Procurement and maintenance of adequate facilities and equipment are a particularly difficult aspect of science programs in community colleges. At their inception, community colleges frequently occupy high school buildings after hours. Dual use of the physical plant poses problems which defy solution in regard to the possible modification of these quarters to suit the community college science program (Mason, 1971).

A vast amount of time and effort is being devoted to examining the conditions under which instruction in biology takes place. In one report the National Science Teachers Association recommended that there should be no more than twenty students in any laboratory section. In other aspects of instructional load it recommended that equal credit be given for lecture and laboratory work, hour for hour, in determination of instructor schedules. In addition to a limit in clock hours, considerable attention should be given to the number of preparations, additional departmental duties, and extra reimbursement for extra hours taught. A load of ten to twelve contact hours was recommended, with a fifteen hour maximum. In regard to laboratory facilities and assistants, it recommended that since animal rooms and greenhouses are a necessity, they should be adequately staffed. In regard to assistants, they should be adequate for the number of faculty and students in the laboratories (Eiss, 1967).

CUEBS and Community College Biologists

The Commission on Undergraduate Education in the Biological Sciences (CUEBS) was created during the last decade to look at the teaching of biology in undergraduate institutions and community colleges. Almost at the outset CUEBS recognized the critical and key role of the teacher in improving undergraduate education. A vast number of reports and several regional conferences were developed and executed toward the goal of the improvement of instruction, facilities and curricula (Kormondy, 1971a; Kormondy, 1971b; Creager and Ehrle, 1971; Hurlburt, 1971). Questionnaires revealed that community and two-year college biologists averaged 17 contact hours per term with 45 students per lecture and 22 students per laboratory section. Seventy-five percent of their working hours were spent teaching. Of these biologists, half taught 15-19 hour loads, while one-quarter taught 20 or more contact hours! Decreased teaching load was ranked first in a list of conditions that might be important to them in doing a better job. Another critical area concerned salary. The average salary of $11,200 was considered $2,000 below what was considered a reasonable sum. The average amount budgeted for use in increasing professional competence, attendance at conferences and meetings and presenting papers was $75 per faculty member in 1969-70.

Collective Bargaining as an Aid to Solution

One frequently used means of solving the problems of the community college biologist has been by utilization of collective bargaining to provide written contracts which specify and limit working conditions of faculty members. Ten to fifteen percent of all collegiate faculties across the nation are already under the aegis of collective bargaining statutes and it is predicted that more will join their ranks in the not too distant future. Collective bargaining is a phenomenon of the 1960's in education which has significantly increased its impact each year in all aspects of the educational process of community colleges. It is a process by which both faculty and administration sit down in a negotiating atmosphere to write a master contract spelling out in great detail most aspects of the wages, hours and working conditions of the employed faculty. It is a problem solving process which each year has increased in breadth as it encompasses faculty committee structure, curriculum, budget, tenure and other aspects of faculty-related activity in the community colleges. Examples of such items are textbook selection procedures, teaching assignments, teaching hours, release time, clock length of class periods, curriculum committee selection procedures, class size averages and length of the semester and the instructional year (Young, 1969). The Agreement at Macomb County Community College, Warren, Michigan, a school related to this present study illustrates the complexity and breadth of such contracts (Macomb County Community College Faculty Organization and Macomb County

Community College, 1972). When these agreements are produced a great deal of time and energy is expended by both sides in reaching concensus. Bargaining can be a protracted process and when deadlines are attached to such activities by one or both sides, problems often arise. Although the agreement itself constitutes a significant influence of society upon biologists and biology instruction, the breakdown of the bargaining process itself may be an even greater short-term influence.

Strike and Impasse

When bargaining breaks down and progress in the negotiations processes ceases, the result is termed an impasse. When the faculty resorts to work stoppages and the withholding of services to exert political power to force a return to the bargaining table the resulting action is termed a strike (NEA Research Staff, 1970). When a breakdown of the bargaining process occurs there are several alternatives to aid further progress. Mediation, fact-finding or advisory arbitration, and compulsory and binding arbitration are all viable alternatives. It is helpful to regard strikes as a breakdown, as opposed to an extension of the bargaining process. The probability exists that the ultimate end of the strike will come through negotiations (Howe, 1970).

Sometimes the impasse situation can be prolonged for days or months as was cited earlier in the Macomb contract situation. It would be of value to see if such a climate is damaging to the faculty and students as well as the intellectual climate for teaching-learning. Negotiators from both sides of the bargaining table could then have a better understanding of the relationship between the bargaining climate and the intellectual climate of the institution. At the same time the biologist who is a member of the faculty of such an institution could be more aware of these same relationships and could plan ahead in his own teaching to strive actively to separate the classroom atmosphere from the atmosphere of negotiations.

Statement of the Problem

What is the relationship between the collective bargaining process in the community college and:

(1) the attitudes of the biology instructor toward that process,
(2) the attitudes of the biology instructor toward his own teaching,
(3) the attitudes of students in an introductory general biology course toward that process,
(4) the attitudes of students in an introductory general biology course toward their own learning,
(5) faculty attitudes toward affective course goals in biology,
(6) student attitudes toward affective course goals in biology,
(7) student cognitive outcomes in biology?

Definition of Terms

For the purposes of this study the following consists of the necessary terms which need defining:

Collective bargaining is an adversary situation in education where a board of trustees, usually through the services of its administrators, negotiates with faculty representatives all aspects of a written master contract which governs wages, hours, working conditions and all other substantive and procedural matters deemed necessary to the effective running of an institution of higher learning. The bargaining procedure ends with written agreement upon terms for a given period of time which becomes the life of that contract.

A community college is a two-year college in a specific geographic community which has as one of its goals the general education in science of some of its students.

An extended impasse is a situation in collective bargaining where the faculty and administrators have been unable to continue progress toward a written agreement. Bargaining has broken down and the faculty has gone on strike. A court order has returned them to work until such time as they complete the deadlocked negotiations process. The teaching-learning situation exists during negotiations but no resolution on contract has occurred.

Non-impasse is defined as a collective bargaining situation where a contract is either extant or concluded prior to the beginning of a semester of instruction.

A strike is a withholding of services or work stoppage undertaken by a faculty because of a breakdown in the collective bargaining process.

A master contract is a ratified collectively bargained agreement between a board of trustees, through administrative representatives, and a faculty represented through its recognized union. This contract covers wages, hours, working conditions and such other items as each side deems necessary.

An attitude is a learned predisposition to respond in a consistent evaluative manner toward an object or class of objects. The phrase consistent evaluative manner refers to a dimension variously characterized as pro-con, favorable-unfavorable, positive-negative or desirable-undesirable.

An affective course goal in biology is an attitudinal goal included within the confines of the curricular structure of that course.

An introductory general biology course is a course in biology, with no prerequisite for student entry, dealing within the domain of general education, and stressing content materials in botany, microbiology and zoology.

The success rate is an evaluative technique utilized at Macomb County Community College which is based upon the total number of students receiving a grade of "C" or better divided by the total number of enrolled students.

An adverse influence is a factor which causes a negative effect upon a defined situation in this study.

An opinionnaire is a questionnaire constructed to elicit student opinion from which student attitude can be deduced.

Hypotheses

1. An instructor who taught during an extended impasse collective bargaining situation will express a more negative attitude toward collective bargaining as measured by responses to a 30 item Likert type opinionnaire and three semantic-differential scales concerning collective bargaining than will an instructor who taught during a non-impasse situation.

2. An instructor who taught during an extended impasse

collective bargaining situation will rank collective bargaining and impasse as more important adverse influences on his teaching effectiveness as measured by his responses to three sets of forced choice rank ordering items than will an instructor who taught during a non-impasse situation.

3. A student who enrolled in a class during an extended impasse collective bargaining situation will express a more negative attitude toward collective bargaining as measured by responses to a 30 item Likert-type opinionnaire and three sets of semantic differential scales concerning collective bargaining than will a student enrolled during a non-impasse situation.

4. A student who enrolled in a class during an extended impasse collective bargaining situation will see collective bargaining and impasse as more important adverse influences on his learning as measured by his responses to three sets of forced choice rank ordering items than will a student who enrolled in a class during a non-impasse situation.

5. An instructor who taught during an extended impasse collective bargaining situation will express a more negative attitude toward affective course goals in biology as measured by his responses to 10 sets of semantic differential scales concerning affective goals in biology than will an instructor who taught during a non-impasse situation.

6. A student who enrolled in a class during an extended impasse collective bargaining situation will express a more negative attitude toward affective course goals in biology as measured by his responses

to 10 sets of semantic differential scales concerning affective goals in biology than will a student who enrolled in class during a non-impasse situation.

7. Macomb County Community College students who enrolled in class during an extended impasse collective bargaining situation will exhibit a lower success rate than students who enrolled in class during a non-impasse collective bargaining situation.

8. The attitudinal variables can be predicted from a combination of the various biographic characteristics of faculty and students.

Assumptions

These assumptions are divided into two sets, those for which no evidence exists and those for which some evidence exists. For the purposes of this study, it has been assumed:

1. that student grades as measured in a Success Rate Scale would be a valid representation of the achievement of course goals in biology,
2. that cooperation would be obtained from all necessary levels both at Macomb County Community College, Warren, Michigan, and Oakland Community College, Bloomfield Hills, Michigan, for pursuit of this study,
3. that the response of opinionnaire returns would be representative of each student population,
4. that the two student populations would be equivalent in terms of their backgrounds.

Some evidence exists for the following assumptions:

1. that the Carlton Collective Negotiation Scale as modified by Moore could be used to measure faculty and student attitudes toward collective bargaining,
2. that sets of rank order forced choice items can be utilized to measure faculty and student attitude toward their own teaching/learning,
3. that sets of semantic differential scales could be developed to measure faculty and student attitude toward collective bargaining and toward affective course goals, and
4. that the course syllabi in biology from each college would be of a similar nature, or express similar outcomes to those of other community colleges in that geographic area of the United States.

Limitations of the Study

The following were considered limitations:

1. The faculty sample was limited by those faculty in each college biology department who responded to the opinionnaire.
2. The student population was comprised from students who were enrolled in sections taught by the full-time faculty of each college and the sample limited to those who responded by mail to the opinionnaire.

Delimitations of the Study

The following were considered delimitations:

1. The study occurred in only two selected colleges in the state of Michigan.
2. The faculty were community college instructors of general introductory biology courses during the Fall Semester, 1972 at the two colleges.
3. The students were community college students of general introductory biology enrolled in courses taught by the above-selected instructors at the two colleges.
4. The course was general introductory with no entry prerequisites.
5. The faculty are instructors who indicated support of the affective course goals in their general course.

Overview

Collective bargaining has emerged within the last decade as a potent tool of faculty in Michigan community colleges to help them to bargain with boards of trustees for the improvement of educational conditions. Sometimes the protracted negotiations processes lead to strike and impasse situations. This research was designed to study the process of bargaining and bargaining impasse to see what relationships exist between the phenomena and faculty and student attitudes toward the bargaining process itself, bargaining impasse, faculty strikes, teaching and learning under such conditions, and affective course goals in biology. The research was conducted by means of a nine page opinionnaire comprising four parts. The research began with a pilot study and was followed by the major study.

The second chapter contains an extensive review of the related literature pertaining to community colleges, collective bargaining, impasse resolution, affective goals in science and biology, and a review of all literature directly related to strikes by teachers and their effects. Chapter three contains information pertinent to the design and procedures. Chapter four contains portions relating to the nature of the sample, the responses and response rates, and the results of descriptive, correlational, one way and two way multivariate and univariate analysis of variance and covariance, factor analysis, and stepwise regression analysis of the data. A summarization of the data by hypothesis follows. Chapter five concerns conclusions, implications and recommendations related to the research.

CHAPTER II

A REVIEW OF THE RELATED LITERATURE

The literature review has been divided into sections dealing with community colleges, community college students, goals and objectives of teaching in biology and science, attitudes, collective bargaining, and the group of studies directly related to strikes by teachers and their effects upon students.

The Community College

The nature of the community college, coming as it does between the secondary school and the college and university, causes confusion for many people. The two year college is neither a four year college nor a copy of the first two years of such a college. Emphasis upon a two year organization, sets the community college apart from four year institutions as well as from the high schools. Students do not attend a community college for the same reasons or objectives which motivated students several decades ago to elect post graduate courses in high schools or attend a preparatory school for a fifth, post graduate year. The community college is not a vocational school. Although it may have as one of its objectives the preparation of its students for gainful employment, it does not exploit the same vocational areas, or if it does, then not in the same manner as the vocational high school.

Though many community colleges may in certain circumstances be organized under the board of education of a local school district because of older laws permitting such districts to offer thirteenth and fourteenth years of instruction, the status as a two year college protects them from categorization as merely an extension upward of elementary and secondary education.

The word community is quite important. Every educational institution serves a constituency. These constituencies are diverse. The more obvious constituency of a state university is the state which maintains it, but this does not thus limit its services and benefits to within state boundaries. Many universities regard themselves as serving a constituency of national and even international scope. The constituency of a community college is the community, whatever that may be. Typically, a community denotes a relatively small and reasonably well defined geographic area. The implication is that what may be appropriate for one community college may be inappropriate for another. The needs of the community determine the program and not a more or less inchoate understanding of what is done in any other like institutions (Stoops, 1966).

Most important is the word college. Although the community college has a role which differs from that of the high school, the vocational school, the public school and the four year college, the role of a community college is that of a college. It is an institution of higher education.

Michigan was one of the first states to pass a junior college law. Act No. 146, Public Acts of 1917, empowered the board of education in any school district with a population of 30,000 to offer high school graduates advanced courses of study which were not to embrace more than two years of collegiate work. These courses were to be collectively known as the junior collegiate department (Fink, 1952). At the second annual meeting of the American Association of Junior Colleges, Memphis, Tennessee in 1922, the junior college was defined as "an institution offering two years of instruction of strictly collegiate grade" (Bogue, 1950, p. xvii). Three years later a significant change took place when the junior college was encouraged to develop a different type of curriculum suited to the larger, ever changing civic, social, religious and vocational needs of the entire community in which the college was located. From this generalization stems the origin of the modern community college concept. Frank W. Thomas, in 1926, set a pattern that has been followed fairly closely in defining the functions of the community college. As he perceived it, the community college has these basic functions: popularizing, preparatory, terminal and guidance (Brunner, 1970).

In the regular session of the 66th Michigan Legislature, Public Act No. 189 of 1951, the Community College Act was passed. It provided for a broad extension of the community colleges in Michigan by lowering the district population requirement to 10,000, and by allowing the schools to offer both collegiate and non-collegiate courses. It also established the name "community college" (The Community College in Michigan. Staff Study No. 1, 1957). Most of the larger community colleges in Michigan were organized as community college districts, usually contiguous with the county boundaries, and supported through local millage and bonding, student tuition, and per-pupil state aid. The expansion of this level of education has continued through the last decade and in Michigan includes twenty-nine such schools, the larger being Oakland Community College and Macomb County Community College, the latter with a student population in excess of 19,000 total students and a 10,000 full-time-equated student enrollment.

The Community College Student

In spite of their diversity of background and geographic area the community colleges usually show a close similarity in their organization and their course offerings. Generally community colleges ascribe to five purposes: the provision of general and liberal educations within the framework of the disciplines of science and mathematics, the humanities, the speech and communications areas and the broader social sciences; the provision of more specifically organized occupational programs tailored closely to community needs and covering a broad spectrum of programs from aeronautics to medical technology which are more abbreviated in nature and allow the student to reenter more rapidly into the community work force; the provision of transfer and parallel courses in the preprofessional areas related to the sciences and arts; the provision of a broad spectrum of adult education courses tied closely to community need; and finally, an extensive guidance and counseling program designed to meet a broad spectrum of student needs in these areas. Because of this uniformity of purpose and the geographic proximity to student homes the community colleges attract a rather similar student population. The 1966 American Council on Education study of 250,000 college freshman showed a socioeconomic order very similar to that derived from a 1959 study of 10,000 high school graduates (Cross, 1968; Astin, Panos and Creager, 1967). Both studies revealed that while universities were attracting predominantly the children of higher income, high occupational level, and college educated parents, the community colleges and public four year colleges tended to attract smaller proportions of students from higher socioeconomic backgrounds. The order of rank for the various classifications of institutions in terms of the relative proportion of these students which they attracted was: (1) private university (Harvard, Yale, Columbia), (2) Catholic four-year school (Notre Dame, University of Detroit), (3) Protestant four-year school, (4) public university, (5) private two-year college, (6) public four year college or community college (Medsker and Trent, 1965).

In analyzing data relative to project TALENT, Cooley and Baker (1966) found that the community college group fell between the non-college and the senior college groups on every one of seven indices of socio-economic status: education of father and mother, occupation of the father, the number of books in the home, whether or not the student had a room, desk and typewriter of his own at home, and others. Schoenfeldt stated that the student ability as well as the socio-economic status of the family tended to influence whether or not the student would go on to college or not (Cooley and Baker, 1966).

Since the community college student appears to be in a rather homogeneous group in terms of ability, many of the curricular goals and objectives of the community colleges have had a similar trend of development, and a similarity of purpose is found in such schools. The goals and objectives of science and biology should be viewed in that light.

Goals and Objectives of Science and Biology

Excellent sources for the charting of the evolution of goals and objectives for cognitive and affective outcomes in science and biology are the Yearbooks of the National Society for the Study of Education. In the year 1932, it was felt that one should teach the major generalizations of science and the associated attitudes of science which are important and extensive enough in scope that the student could live with them throughout his life. It was felt that goals will have been attained if students acquire an ability to utilize the findings of science that have application to their own experiences, and an appreciation of scientific attitudes through some of the methods of study used by workers in the fields of science (National Society for the Study of Education, 1932). By the year 1947, the objectives for science instruction were more specific. The following were proposed: the acquisition of functional information or facts, functional concepts, functional understanding of principles, development of instrument skills, and the fostering of the important problem solving skills along with the associated attitudes, appreciations and interests. The fostering of attitudinal objectives was given equal emphasis with the fostering of the various intellectual goals in science. The writers conclude that growth toward the objectives of science instruction, both functionally and attitudinally, affects the learner's behavior in other situations, both in and out of school (National Society for the Study of Education, 1947). The Fifty-Ninth Yearbook points out that the major goals of science instruction are: teaching of some facts and principles; fostering the development of virtues such as accuracy, critical thinking, scientific honesty, and more generally, scientific method; and, developing an understanding and appreciation of science and scientists which may last usefully through later life (National Society for the Study of Education, 1960).

The above mentioned goals and objectives of biology and science teaching have been dealt with by a number of studies and conferences. Paul Diederich's work in the area of attitudinal objectives in science pointed up the need to foster a positive attitude toward the ability to solve problems, desire for experimental verification of results, precision of work, a willingness to change opinions when presented with new data. A need was seen to foster objectivity of attitude, desire for completeness of knowledge, willingness to suspend judgment, an awareness of assumptions, a respect for theoretical structures and the acceptance of probabilities and warranted assumptions (Diederich, 1969).

In 1967, the National Science Teachers Association sponsored four regional conferences on the topic of scientific literacy: one each at Philadelphia, Pennsylvania; Wichita, Kansas; Berkeley, California; and Jacksonville, Florida. At the latter conference the following were selected as the most likely affective domain objectives achievable through science: an awareness of conditions which includes an appreciation of the interaction of science and society, recognition that science grows possibly without limit, that the achievements of science and technology, properly supervised, are basic to modern living, and appreciation that science depends as much on its inquiry process as on its conceptual patterns and theories; an acceptance of values which includes the rejection of myth and superstition, and valuing the weighing of evidence; and a preference for values which includes appreciation of the scientist as a person, a willingness to be convinced by evidence, valuing the methods and procedures of science, openmindedness and curiosity (Butler, 1967).

Eiss and Harbeck (1969) make several additions to these: an awareness of conditions which includes an appreciation of the interaction of science and the arts, as well as an appreciation of the cultural conditions under which the scientific enterprise is promoted; an acceptance of values which includes the realization that science is a basic part of modern living; a preference for values which include curiosity, patience, persistence, openmindedness and confidence in the methods of science. Those objectives are directly related to the field of biology. Others included would be: an appreciation for the processes of biology; a fostering of openmindedness in the biology student; the valuing of logical reasoning, an important aspect of scientific literacy related to the reading of literature; an appreciation of scientific attitudes, which is directly related to aspects of the methods of science; and the acquisition of the important, socially pertinent attitudes, interests and appreciations related to science. The attitudes selected for inclusion in this study were taken from such sources as previously described.

Attitudes

Since the present study deals in some detail with the measurement of attitudes toward collective bargaining as well as attitudes toward a number of specific affective goals in biology teaching, it is pertinent to look more closely at literature related to attitudes and attitude measurement. The general nature and definition of attitudes is studied in great detail in the literature (Thurstone and Chave, 1929; Shaw and Wright, 1967; Boggs and Herrscher, 1968; Ostrom, 1969; and Best, 1970).

Ellish (1969) conducted a study on the effects of attitudes toward educational institutions on academic achievement in California. He felt that a student's attitude toward the educational institution he attends may have an effect upon his academic achievement at that institution. Using the method of "equal appearing intervals," as originally developed by Thurstone, he developed two attitude scales. One scale was to determine student attitude toward the junior college; the second scale was to determine student attitude toward the four-year college. Each consisted of fifteen statements reflecting various opinions toward the institution in question. Each statement had a predetermined attitude value, and the groups of statements ranged along a continuum from most negative through neutral, to most positive attitude toward the institution. The two scales were administered to 1450 high school seniors in 1965. Of those students completing the attitude scales, grade records were obtained for the first semester of college work for 456 students who had completed twelve units of course work or more in a California institution of higher education. Using the "matched pair" process, two groups of students were selected for further investigation: one group of seventy-five students who had entered a junior college in the fall of 1966; the other group consisting of seventy-five students who had entered a four year institution. The students were matched by sex, high school, grade point average, standardized test results and occupation of the father. It was found that the mean grade point average was lower for the junior college group than for the four-year college group. It was found that while the college students possessed a positive attitude toward their school, the mean attitude of the junior college students toward the school they attended was basically neutral. There was a positive correlation at the .01 level of significance between attitude and grade point average for both groups. The author concluded that: there is a definite correlation between the attitude a student has toward the educational institution attended and his performance at that institution; and that students in the junior college do so with a less favorable attitude than comparable four-year college students, and many of these junior college students perform less well academically than their four-year college counterparts.

A study by Franklin and Li (1971) concerned faculty attitudes toward student activism. The study was undertaken by interviewing fifteen percent of a large mid-western university in the spring of 1970. The study focused on the extent to which faculty status, faculty year of birth, and the involvement of the faculty member in liberal social movements while a student in college were related to faculty attitudes toward student activism. The technique of attitude measurement was Thurstone's equal appearing intervals. Forty-five validated items were constructed, the median scale value was computed for each item, and a faculty response equated to that value. The results showed that discipline affiliation was a poor predictor of faculty attitudes toward activism. In terms of age, younger faculty tended to be more sympathetic to student activism while older faculty tended to be more conservative. One reason for the responses of the older faculty may have been the period of time in which they were reared. Faculty who were involved in liberal activities while attending college were more approving of current student activism. In terms of status, the higher a faculty member's rank, the more conservatively he viewed student activism.

A study by Ostrander (1970) of 511 teachers from five school systems was conducted to determine if they would respond favorably or unfavorably to seven statements regarding sanction activities by teachers. Scalogram analysis was performed to determine if the items formed a unidimensional scale in each of five systems. The Kendall coefficient of covarience was computed for the matrix of rank orders of item endorsements within each system. In three systems all seven items formed unidimensional scales with coefficients of reproducibility of .909, .913, and .917. In the remaining systems the coefficients were .907 and .914 for six-item scales. The Kendall coefficient of concordance was significant at the .001 level supporting the findings that teachers share a frame of reference concerning sanction activities, that the score could be predicted from background variables such as sex, family size, income, and length of service. The report did not include the specific results in terms of a mean, or if they are favorable or unfavorable toward sanction activities.

Neidt and Hedlund (1969) devised a study to investigate the longitudinal covariance of attitude toward subject matter and achievement during a course in general psychology. Five measures of student attitudes toward subject matter and achievement were obtained at time intervals of two weeks throughout the course. The subjects included 866 freshmen and sophomores at Colorado State University and the University of Missouri. The test items were set in a Likert 5-point constant response scale which was weighted zero to four. Scores on the attitude scale were the sums of the weighted responses to the ten items. Curves were fitted to the attitudinal variable and achievement over time. The curve fitting was accomplished by determining the mathematical function which most adequately accounted for the total variance in the variable through a polynomial regression analysis. Analysis of the data lead to the conclusions that the cognitive and affective outcomes are relatively independent. Changes in one realm do not necessarily lead to changes in the other.

Attitudes Concerning Science

The term "attitude," as used in the literature on science education, has multiple meanings, and it is important to know precisely which meaning a given writer is using in order to understand and evaluate his research. The majority of studies on "attitudes toward science" have been concerned with affect or feeling - like versus dislike - toward science in general or a particular science. Other investigations have dealt with "attitudes toward scientists" which refers to like versus dislike or approval versus disapproval of the activities engaged in by scientists and the kinds of people scientists are.

Finally, another group of research investigations has dealt with the more cognitive "scientific attitude," which is another term for adherence to or knowledge of the "scientific method." For example, Haney (1964) proposed that there are eight aspects of the scientific method including openmindedness, curiosity, rationality, and others. On the other hand Diederich (1967) listed twenty components of the scientific attitude (Aiken and Aiken, 1969).

Attitude Changing

A study by Schwirian and Thomson (1972) examined the changes in attitude toward science and science institutions which had occurred among undergraduate university students between 1967 and 1971. Two similar groups of students were given form A of the Schwirian Science Support Scale (Tri-S) in 1967 and 1971. The populations were 398 and 153 students. Data concerning relevant independent variables was also collected. The major independent variable, time of administration

(1967, 1971) was always one factor as the data were analyzed using two way analysis of variance. The second factor in each ANOVA consisted of each of the nine contingent independent variables: age, sex, religious preference, education of father, education of mother, occupation of father, academic major, size of hometown, and type of high school. Data showed significant differences at the .05 level in only two instances: Tri-S score with father's occupation at time 1 and time 2, and higher status of father's occupation with a higher student Tri-S score. There was no significant effect of time.

The findings indicated that the 1971 midwestern university students in the sample were no less positive in their attitudes toward science than the 1967 students.

Starr (1972) conducted a study designed to isolate the attitudes of high ability ninth grade BSCS students toward instruction utilizing "Invitations to Enquiry." Both the control and the experimental groups received similar instruction with the addition of twenty "Invitations to Enquiry" to the experimental class over an eight week period. No significant differences in attitudinal scores were found as measured by Remmer's "A Scale to Measure Attitudes Toward Any School Subject." When the post-study scores were adjusted for pre-study attitudes, IQ, and mid-study attitude, no differences in attitude were found at the end of four weeks of the study when adjusted using prestudy attitudes and IQ.

Oswald (1971) considered the influence of dogmatism in a study to determine if a significant relationship existed between levels of dogmatism of student teachers and supervising teachers and changes in attitude of student teachers during student teaching. She worked with 92 elementary school student teachers and 85 supervising teachers. The "Minnesota Teacher Attitude Inventory" was administered as a pre-post measure to the student teachers and the "Rokeach Dogmatism Scale" was given to both student teachers and cooperating teachers. Both pre- and in-service teachers were grouped as H (high dogmatism), L (low dogmatism) and assignments were made so that four groups were formed. These groups on the basis of dogmatism were HH (both student teachers and cooperating teachers high dogmatic), LL, HL, LH.

When the data were analyzed there were no significant differences in attitude in any of the four groups.

There was no significant relationship between change in attitude and grade level of the student teacher or pattern of student teacher identified. There was no significant relationship between the supervising teacher dogmatism and age, grade level or years of experience.

Testing for Attitude Change in Science

A study by Kimball (1967) explored the understanding of the nature of science exhibited by science teachers qualified with a major in science as compared with practicing scientists with similar academic backgrounds. A model of the nature of science was constructed by the investigator, and a scale was prepared to measure departures from the model. The "Nature of Science Scale" (NOSS) contained 29 statements about the nature of science to which the subjects responded, "agree," "Disagree" or "?." A questionnaire accompanied the opinion scale to elicit occupational information.

Population samples were drawn from among 956 science and philosophy majors graduated in five selected years from Stanford University, and San Jose State College, and 712 replies were received. Comparisons among various subgroups were made by F and t-tests. Major categories of respondents were then compared per item by chi-square to seek patterns of difference between groups.

When the variable of undergraduate education was controlled, science teachers did not differ in the understanding of the nature of science from working scientists, although both groups scored lower than was expected. The understanding of science expressed by scientists or teachers was not different for the various graduating classes. In the population studied, science teachers were found to be at least as understanding of the nature of science as their professional scientist counterparts. Any weakness in educational programs could as well be identified in the undergraduate science programs as in teacher education.

Measurement of Attitude Toward Science

Although many different science attitude scales have been constructed, the development has usually followed a similar pattern. The characteristics of a positive science attitude are defined and then items pertaining to these characteristics are devised to search for these characteristics in respondents. However, where the answer is obvious, many respondents may choose to answer in this way rather than in the manner that correctly reflects their attitude. A newer approach to the measurement of attitudes toward science was described by Cooley and Reed (1961). The Reed Science Activity Inventory evaluated science interest by determining the voluntary activities in which the student had engaged. The scale consisted of 70 science related activities to which the subjects responded by stating whether they had participated in the activities during the past year, and if so, with what frequency. Factor analysis of the 70 items revealed six factors: (1) general science, (2) nature and environmental, (3) science hobby, (4) "thinking about" science, (5) high verbal activity, (6) science in the home. The investigators concluded attitude toward science was not unidimensional.

Rothman (1968) undertook a study to determine the degree to which a science related semantic differential instrument predicts achievement in a freshman physics course and a freshman chemistry course. The instrument contained 12 concepts and 16 five-step scales. The combined undergraduate raw data, in a student-concept versus scales configuration, were subjected to an image analysis with a subsequent varimax rotation. Three factors were identified: evaluative, intellectual-activity, and intellectual-difficulty. The same raw data, but in a student-scale versus concepts configuration, were again subjected to an image analysis and rotation according to the varimax criterion. Two concept groupings were revealed: three with positive connotations and three with negative connotations. A six score profile was produced for each subject. Three indices of profile similarity were calculated linking each of the undergraduate subjects to an appropriate criterion profile. Multiple regression analysis attempted to relate the six semantic differential scores, the three profile similarity indices, and the RSE variable (Regents Scholarship Examination) with a suitable criterion of success, first semester grades in freshman physics and chemistry. The statistically significant relationships between the scores derived from the semantic differential and the criterion were weak. The D^2 analysis of the difference between group profiles indicated that the semantic differential test results did differentiate in an orderly and logical way among the several groups considered in the study and that traits other than those measured by IQ tests are capable of predicting the results of academic endeavor.

There are several usable techniques found in the literature. The Likert-type scale and the semantic differential have been used in several studies to elicit opinions from groups.

Collective Bargaining in Higher Education

> Professors refuse to join unions or engage in collective bargaining because of a feeling prevalent among them that their salaries are not of the nature of wages, and that there would be a species of moral obliquity implied in overtly so dealing with the matter (Veblen, 1918, p. 162).

Veblen's comment coupled with the fact that a statement that "collective bargaining will become widely adopted as a method of determining faculty salaries and conditions of employment," was ranked in the bottom ten events likely to occur in the '70s in an American Council of Education survey, gives some idea of how rapidly collective bargaining affected higher education (Howe, 1970, p. 63).

For higher education in New York State the impetus came from the 1967 enactment of the New York Public Employees Fair Employment Act

(The Taylor Law). As one of the more comprehensive public employment acts it covers virtually every public employee in New York State. Based upon experience to date under the Taylor Law, many are predicting that all of the community colleges in New York, with few exceptions, will be organized and engaged in collective negotiations within the next few years (McHugh, 1969).

Take next the case of the City University of New York. It is both one of the oldest and youngest units of public higher education in the nation. Started in 1847, with the organization of what is now City College, it had evolved by the 1950's into a system of four autonomous colleges with approximately 65,000 full- and part-time students. The decade of the 60's witnessed a period of unparalleled growth. Capped by the formal designation of university status in 1961, CU has become a giant of an institution comprising eight four-year colleges, ten two-year colleges, an affiliated medical school, an autonomous graduate center and several urban schools offering both vocational training and college adapted programs. The total student population, including 79,000 full-time students, approximates 160,000 students. In such a mega-university situation, most faculty members, convinced that their professional existance could no longer be protected through individual initiative, and in the face of forces outside their control, when given a choice decided in favor of unionization (Polishook, 1970).

Collective Bargaining in Michigan

On July 23, 1965, Governor George Romney signed into law Act 379 of the Michigan Public Acts of 1965, which constituted a basic revision of an earlier Employment Relations Act of 1947. The new Act declared it lawful for public employees, including those in the public school service, to join unions. For the first time the Act declared it lawful for public employees to organize in labor organizations to bargain collectively with public employers over wages, hours, and other terms and conditions of employment. In broad outline the provisions of the Michigan statute resembled the National Labor Relations Act. Employees were given the right to select an exclusive bargaining agent by means of a majority vote in an appropriate bargaining unit; employers had an obligation to bargain in good faith with the certified agent, and unfair labor practice charges could be filed with the Michigan Labor Mediation Board by the bargaining agent (as was the case with the original Wagner Act) (Rehmus and Wilner, 1968, p. 1).

Impasse Resolution

The decade of the 60's seems likely to be remembered as a unique period in American education. Certainly one of the characteristics that will distinguish it is teacher militancy. It has become increasingly apparent that teachers have enormous power to enforce their demands when they resort to collective action. Conceptual frameworks have been suggested for analyzing the economic power of any group of employees, public or private. They are of great import when assaying collective bargaining activities of teachers and faculties. When estimating that bargaining power potential there are five components which must be considered:

1. The employees must be irreplaceable for one reason or

another. Either their skills are very specialized or their employers do not dare to replace them.

2. The employees must be critical components of the operation of the organization. The organization is unable to function without them.

3. The cost of disagreement for the employer must exceed the cost of agreement. Dissension must be too damaging to management to continue the impasse.

4. The employees must be acutely aware that they possess these strengths.

5. The employees must have the militancy and cohesiveness to exert effective pressure on the employer.

Any group possessing all of these components maintains enormous bargaining power. Indeed, the question of whether the group has the legal right to bring their collective power to bear on a situation through the use or threatened use of a strike or sanction becomes largely academic. In few instances have teacher organizations been effectively punished for strikes, yet the right to strike is consistently denied public employees by law or precedent in all fifty states (Williams, 1968).

The process of contract bargaining is often a long and tedious process and many of the more important items which do not receive immediate agreement are set aside, to be dealt with later. Many impasse situations occur because of this practice. When a signed master agreement is in sight the bargainers enter what can be the most dangerous and trying phase of the procedure, the let's-finish-up-and-get-some-sleep phase. It is the period of time when demonstrations, slow-downs, picketing and strikes are more likely to occur than at any other period of time in the bargaining process. This is the moment when all the put off items, the difficult ones, that could not really be agreed upon during the earlier negotiations - must be faced and resolved. Too often they are also the most explosive items: salaries, class size, fringe benefits, scheduling of classes and others (Koerner and Parker, 1969). If the parties involved in negotiating do not reach agreement they are at impasse. At some point, one side or the other will have to modify its position. Either faculty or board will capitulate or a work stoppage will ensue, or through rational discussion a mutually satisfactory resolution will be reached (Perry, 1970).

Fact-Finding

One means of eliminating impasse is fact-finding. Fact-finding is neither mediation nor arbitration. A mediator comes into a collective bargaining impasse and attempts, through discussion, to get the parties to come to an agreement, while an arbitrator decides a case and his decision, depending on the agreement, is often binding. A fact-finder is, theoretically, even more impartial. He is a semi-judicial official appointed to review circumstances and data surrounding specific issues in dispute and then prepare a report with recommendations which the parties may or may not accept as a basis for arriving at a contract settlement. He usually enters the scene after collective bargaining has failed and means of mediation have been exhausted. There are two types of fact-finding assignments. The first, and least frequent, involved a grievance by one party under a collective bargaining agreement already in force. The second or "interest fact-finding" concerns the settlement of basic contract issues. Occasionally, as in Michigan, the fact-finder is appointed by the state, which also pays the fees involved.

Fact-finding is also known as advisory arbitration. Strictly speaking, fact-finding may or may not involve recommendations to the parties, while advisory arbitration always does. It is believed that Michigan, in 1954, was the first jurisdiction to adopt a statute authorizing fact-finding in public employment at both the state and local levels. Since then at least nineteen other states have provided for fact-finding for all or some groups of public employees. In 1965, the only states with fact-finding laws for public school teacher disputes were Massachusetts, Wisconsin, and Michigan.

Fact-finding has been successful in New York State about 42 percent of the time in teacher disputes. There are risks involved which fall disproportionately upon the teacher union. Assuming that the general prohibition against strikes in public employment is adhered to, the teacher union is not in a position to reject the fact-finding recommendation. The public agency, on the other hand, can accept or reject with impunity because it is in a position to act unilaterally on the issues (Staudohar, 1970).

The Shift of Authority in Institutions

Collective bargaining has fundamentally shifted the basis for authority within institutions. Written, formal contracts have replaced or qualified many board statutes and by-laws as the basis for campus governance (Duryea and Fisk, 1972).

A brief look at the Agreement at Macomb County Community College, Warren, Michigan, reveals a vast array of provisions and protections that directly affect the instructor as well as the instruction in such an academic area as biology. They are membership as a faculty member on the six standing committees of Academic Standards and Curriculum; Building, Site and Facilities; Financial Affairs and College Budget; Professional Standards; Learning Resources; and College and Student Affairs. The biologist, as faculty member, has freedom of discussion, to set course goals as a department, to use any pertinent materials, utilize any innovative techniques, request the use of any books. He shall be supported with adequate secretarial services competent in biology, can dress as he wishes, determine his own method of grading, receive support for field trips, make up the class schedule as a group, make up an area assignment plan as a group, teach the classes he has chosen and which are listed under his name in the schedule of classes. He shall be supported by science laboratory assistance, has tenure as an instructor, receives full pay for laboratory hours taught, has a lecture class limit of twenty-eight students and a laboratory class limit equal to the number of laboratory stations in that room. He has a teaching load of 14-16 contact hours per week in biology. He is guaranteed ample office space, parking facilities, lounge and study facilities, an adequate classroom environment, the right to determine how extra classes and summer classes shall be chosen to be taught in his area. He receives $300 per year for professional travel and eight days professional leave time in which to do it. He is eligible to be chosen for Sabbatical Leave at full or half pay after seven years of service. All of the above provisions are written, clause by clause, in detail, not just mentioned in passing (Macomb County Community College Faculty Organization and the Macomb County Community College, 1972). Many, if not most, of these contractual items are those deemed critical or crucial to effective instruction by biologists in the two-year colleges (Gunstream, 1971; Eiss, 1967; Creager and Ehrle, 1971; Hurlburt, 1971, Recommendations, 1970; Kormondy, 1971a; Kormondy, 1971b).

Many are beginning to realize in the area of public education that the major responsibility in the area of curriculum and instruction belongs to the faculty. Faculty are more extensively trained than ever before and bring to their task an increasingly sophisticated body of knowledge and skills (Bennion, 1969). It is possible that the objectives being sought through the industrial type negotiations could be achieved through a different model of educational administration which would generate greater efficiency in goal attainment, better policies, higher levels of faculty satisfaction, and less confrontation, unrest, and militancy. But, it involves surrender of authority by boards and trustees (Saunders and Lovel, 1969).

In recent years the parties to collective bargaining relationships have voluntarily undertaken new approaches to collective bargaining which shun or minimize the use of the strike. The primary form of these approaches is a standing union-management committee which includes neutral parties. The basis of such committees is to remove complex technical issues from the purely adversary environment of the bargaining table under a strike deadline and to provide the information and alternatives necessary for a more rational approach to such issues. Thus the purpose of new approaches becomes impasse avoidance, rather than impasse resolution. The incentive for impasse avoidance rests on the absolute level of the economic costs for both sides associated with use of the strike weapon. The level of these costs supports the success as well as the use of these devices as the strike continues to exist as an impasse resolution mechanism. The experience in the private sector indicates that adequate substitutes for the strike and economic power as the basis for bargaining and impasse resolution have not been found. To date all that has appeared is a series of devices which serve to avoid or defer strikes rather than substitute for them in the resolution of conflict (Perry, 1968).

The literature shows that although a multitude of alternatives to the strike in public education do exist, and a multitude of them have been tried, there is no one form superior to any other, unless one takes into account the personal factor, the negotiators themselves, and urges that the best qualified negotiators do the best possible job of bargaining for both sides.

Literature Related to Teacher Strikes

Lester and Risikoff undertook a study of the New York City teacher strike of 1968. One million five hundred thousand children were kept out of school in New York City for thirty-six days when the third school shutdown since September occurred in early October, 1968. When the schools reopened November 18, 1968, teachers from four school districts representing a wide range of ethnic and socio-economic subgroups asked their pupils to talk and write about their activities and feelings during the strike. The children complained of boredom, many watched television most of the time, some studied on their own. Some attended interim schools in local community centers and churches. The balance of the report discussed the progress of the strike toward resolution and was capped with some opinions of the authors. No systematic approach to eliciting or recording or analyzing pupil attitudes was discernible in the article (Lester and Risikoff, 1969).

Swanson studied the twenty-three day teachers' strike in the Los Angeles City Unified School District, Los Angeles, California, April-May, 1970. The purpose was to determine from children and parents some of their attitudes towards teachers and toward the strike. Data were secured from 15 schools of the 144 schools operating in the area of the Los Angeles School district. Data were examined in relation to the percentage of teachers who struck in that school. All 807 responses from the students were usable.

Analysis of the data revealed that the children were glad the strike was ended; they did not feel that their teachers were different from the way they were before they walked out. The number of teachers who struck a school made little difference in the attitudes of children toward the strike. In general, children opposed the strike and its ramifications, but young children and girls viewed it more negatively than did older grade school children and boys. The parents were sure they knew why the teachers struck; they opposed this action, and were more concerned with the possibility of another strike than were the children (Swanson, 1970).

A study in Philadelphia following the teacher strike of September, 1972, and January-February, 1973, selected a sample of 716 seventh and eighth grade students tested on Iowa arithmetic and reading sub-tests in May, 1972, and May, 1973. The study asked the question, "What effect does a prolonged bitter teacher strike have on pupil achievement?" The answer appears to be - none. There were no significant differences in the arithmetic and reading achievement of junior high school students who attended full-time during the strike and those who were out the entire eight weeks (Lytle and Yanoff, 1973).

Blendinger (1968) undertook a study concerned with the attitudes of secondary school students who experienced teacher activism. The population of this study was comprised of high school students in 5 school districts in the State of Michigan which were selected randomly from 30 school districts that had experienced teacher strikes.

The purpose of the study was to investigate the student attitudes toward teacher image, teacher economic status, choice of teaching as a profession, teacher strikes, violation of the law by striking teacher groups. The study also sought to determine if there was a significant difference concerning any of the before-mentioned attitudes in regard to: sex of the student, length of time residing within the community, and whether strikes foster closer student-teacher relationships. The major findings were that students do not support strikes as a means of improving education, do not think teachers should violate the law by striking, and do not feel the quality of their education suffered because of teacher strikes (Blendinger, 1970).

The purposes of a study by Carlton (1966) were to identify, measure, describe and compare the attitudes of North Carolina teachers and principals toward collective negotiations and sanctions. He constructed a Collective Action Scale which measured the affective responses of these people to questions dealing with collective action. From a population of 46,809 teachers and principals he sampled 1249 of which 845 responded to his questionnaire. He analyzed the data from the Likert-type scale by the use of the Pearson product-moment correlation for both collective action and traditional-progressivism. From the results he concluded that male teachers were more favorable toward collective negotiations than female teachers. Male teachers were more favorable to collective negotiations than male principals. Female teachers tended to be neutral on the subject of collective negotiations. The author felt that leadership among teachers would tend to come from male teachers.

The purpose of a study by Lingenfelter (1971) was to determine if a relationship existed between the student teacher attitude toward collective negotiations and sense of power as evidenced by scores on tests administered before and after student teaching; between the cooperating teacher's scores; and between the college supervisor's scores. A second purpose was to determine whether the cooperating teacher's attitude toward collective negotiations influenced the student teacher's attitudes toward collective negotiations and sense of power. A third purpose was to determine whether the cooperating teacher's sense of power influenced the student teacher's sense of power and attitudes toward collective negotiations. A fourth purpose was to determine whether the college supervisor's attitudes toward collective negotiations influenced the student teacher's attitudes toward collective negotiations. The author used a modified form of a Collective Negotiations Scale developed by Carlton and a Sense of Power Scale developed by Moeller.

The data were collected during Autumn, 1970, and 92 percent of the 267 cooperating teachers and all 290 of the student teachers and all 15 of the college supervisors returned questionnaires. The two basic statistical tools utilized were the Pearson product-moment correlation coefficient and analysis of covariance. There was a significant negative correlation between collective negotiations and sense of power scores made by cooperating teachers, college supervisors, and student teachers, both on pre-and post-student-teaching tests of attitudes toward collective negotiations. High militancy cooperating teachers caused an increase of militancy in student teachers, while low militancy cooperating teachers caused little change. The militancy of the college supervisors caused no significant influence on militancy among student teachers. It does not seem that cause and effect can be inferred from the data provided in the study.

A study by Moore (1971) discusses faculty attitudes toward collective bargaining, including collective negotiations, sanctions, and withholding of faculty services. The purpose was to determine whether faculty member's perceptions of their capacity for power and mobility were related to their expression of relatively favorable or unfavorable attitudes toward collective negotiations. The data were collected from faculty in ten of twelve junior colleges in Pennsylvania.

Attitudes toward collective negotiation were designated the dependent variable. The two independent variables were faculty perceptions of their sense of power and sense of mobility. The population for the study was the 951 full-time faculty employed in the sample community colleges in Pennsylvania. A questionnaire was mailed to the group and 64 percent returned them completed. Of these, 57.5 percent were usable. The research questionnaire consisted of 5 parts: (1) Kerlinger Educational Scale, (2) Sense of Mobility Scale, (3) Collective Negotiations Scale, (4) Sense of Power Scale, (5) biographical and career information. Pearson product-moment and point-biserial correlation coefficients were computed for various relationships between the research variables and faculty attitudes toward collective negotiations. A significant negative correlation existed between faculty sense of power and attitudes toward collective negotiations. Also, faculty with a high sense of mobility possessed more militant attitudes than faculty with a low sense of mobility. The most militant attitudes were held by faculty who were young, male, non-Protestant, and liberal. They also held graduate degrees, were without tenure and held lower academic ranks.

Literature Search

The above cited and discussed articles and dissertations are the only materials to be found which pertained directly to science teaching or biology teaching at any level in the schools or the community colleges and universities. The library facilities of the Ohio State University General Library and the Education Library were utilized along with the ERIC Center for Science, Mathematics, and Environmental Education. Those articles unavailable on the campus were located in the G. Flint Purdy General Library and the Education Library at Wayne State University, Detroit, Michigan. The Reader's Guide to Periodical Literature, Dissertation Abstracts, normal periodical searches, two ERIC computerized searches and the CIJE resources were utilized. All literature from January, 1961, through March, 1974, was searched. The year 1961 was chosen because the legislation permitting collective bargaining in the public schools begins in 1962, and the enabling legislation in the state of Michigan in 1965.

The ERIC and CIJE descriptors utilized included: collective bargaining, collective negotiations, negotiation impasses, strikes, teacher strikes, negotiation agreements, community colleges, junior colleges, junior college students, college teachers, faculty, professors, unions, attitudes, attitude tests, student attitudes, teacher attitudes, affective tests, student opinion, student reaction, sciences, science

instruction, science education, ability, cognitive ability, biology, biological sciences, and biology instruction. Boolean operations were utilized in combining the descriptors and computer searches were made to add depth and breadth of coverage to the literature search.

Summarization

The literature has given useful insights about the community college and the community college student. The community colleges display a similarity of function in that most profess the goals of the institution to be providing general education, offering a variety of occupational and technical programs, providing college parallel and transfer courses in the pre-professional areas, the arts, and the sciences, providing community services, and establishing a full program of student personnel and guidance services. The community college student appears to rank low in a number of indices of socio-economic status and community colleges attract a smaller proportion than any other type of school of the higher socio-economic students.

Several techniques were found for sampling student opinion, the most useful being the Likert-type scale and the semantic differential scale. The literature yielded a commonality of purpose for attitudinal goals in biology and such goals as valuing logical reasoning, appreciating the limitations of science, fostering openmindedness, and appreciation of the methods of science, rejection of myth and superstition and appreciation of the interaction of science and the arts were found to be of value to students.

The review of the bargaining literature showed that those items necessary to support biology instruction are found as items of master contracts with increasing frequency. These include such items as budget allocations, support services, scheduling, class load, class size, and number of laboratory teaching stations.

The review of literature pertinent to teacher strikes and student attitudes toward them shows both a superficiality of questioning technique with early elementary children and a complete lack of any study to be found which related those attitudes to any academic discipline. Collective bargaining has been dealt with in opinionnaires for public school teachers and community college faculty, but not with community college students.

CHAPTER III

METHODS AND PROCEDURES OF THE STUDY

Introduction

This chapter deals with the methods utilized and the procedures followed to secure data and analyze it for this study. The chapter includes a general introduction and major sections about the design, a description of the population, the variables and instrumentation, the procedures, and the data analysis design.

The basic plan to secure data in the study was through the use of an opinionnaire responded to by faculty and students of Macomb County Community College, Macomb County, Warren, Michigan; and of Oakland Community College, Oakland County, Bloomfield Hills, Michigan (see Figure 1). Macomb County Community College was selected for the study site because it had experienced a faculty strike in September 1972, followed by an extended period of bargaining impasse. Oakland Community College operated throughout the same semester under the terms of an existing collectively bargained teacher contract and experienced neither a strike nor an impasse bargaining situation.

An opinionnaire composed of five parts was mailed to all of the students at the Macomb South Campus who had enrolled in an introductory general education course in biology, and all students at Oakland Community College who enrolled in a comparable introductory

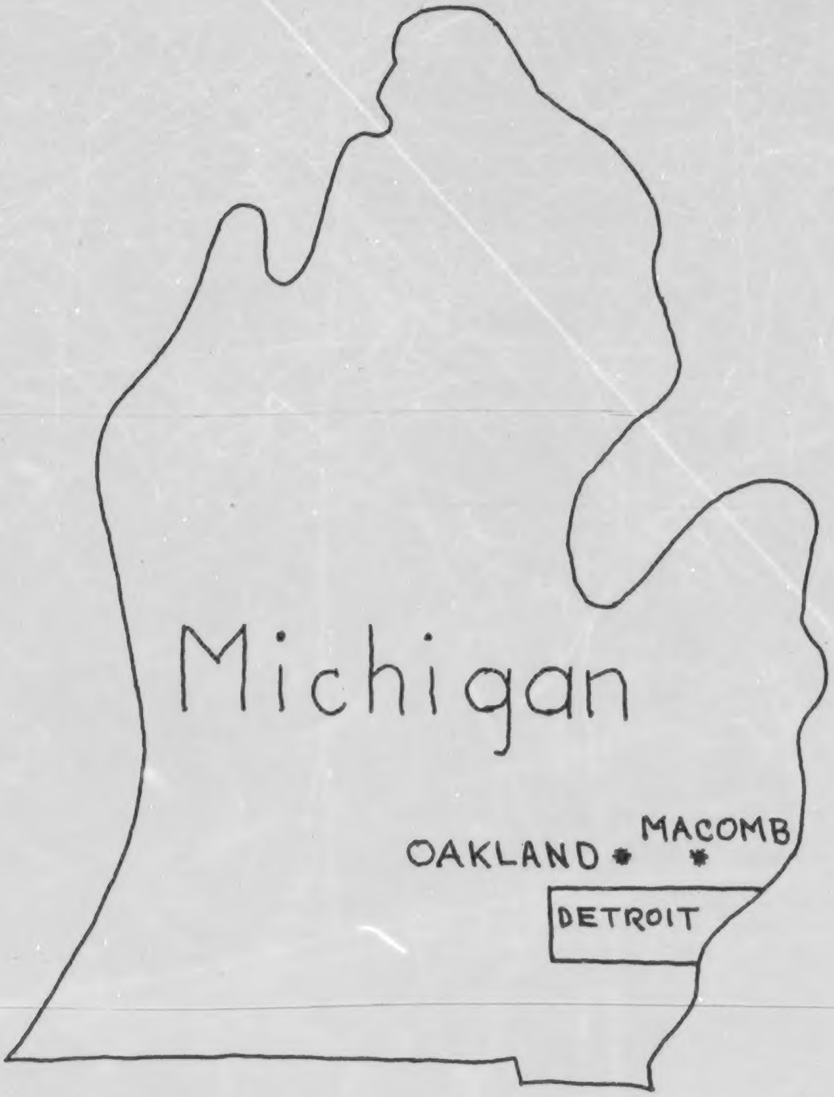

Michigan
OAKLAND
MACOMB
DETROIT

Figure 1. The Locations of Macomb County Community College and Oakland Community College in the State of Michigan.

general education biology course. Part one elicited biographic information about the respondee. Part two was a thirty item Likert-type scale designed to measure attitudes toward collective bargaining. Part three consisted of three sets of forced-choice items designed by the author to measure opinions about attitudinal goals in general biology courses and how they were affected by an extended collective bargaining impasse situation. Part four comprised a group of thirteen semantic differential scales designed by the author. Three of the scales were designed to measure attitudes toward bargaining impasse, sanctions, and teacher strikes. The other ten scales were designed to measure opinions about selected attitudinal goals in general biology courses. In addition to the student sample, each faculty member who had taught these students at the schools involved in the study was administered the same opinionnaire which differed only in the introductory statements to each section, substituting the word faculty for student when appropriate.

The Design of the Study

4 The design of the study was for a research setting for which no data was available prior to exposure to the independent variable of bargaining impasse. The evaluation was done on a post-exposure basis utilizing data from two schools of presumable similar groups who had gone through the same situations except for the independent variable. Data collection occurred after the impasse situation had occurred by means of an opinionnaire mailed to students and given to faculty from the two schools, one which experienced no impasse in a collective

bargaining situation and another which experienced a faculty strike and an extended impasse collective bargaining situation during the semester in which the students were enrolled in classes in introductory general biology. The students were randomly selected and placed into subgroups at each school so that group 1 answered the opinionnaire in terms of recalling or remembering how they felt about the criterion variables in Autumn, 1972. The group 2 students were asked to answer the opinionnaire in terms of Autumn, 1973. There were four groups of students: students from an impasse school who answered in terms of Autumn, 1972, students from an impasse school who answered in terms of Autumn, 1973; students from a non-impasse school who answered in terms of Autumn, 1972, and students from a non-impasse school who answered in terms of Autumn, 1973 (see Figure 2). The faculty members were not subdivided into these four groups. They were asked to respond by remembering or recalling their opinions in Autumn, 1972. Tests of significance in this factorial design were by means of F-ratios computed by multivariate analysis of variance and covariance between the four groups (Fox, 1970; Campbell and Stanley, 1963). In the multivariate and univariate analyses of variance and covariance, it was thus necessary to test for Impasse x Time Perspective Interaction Effect, Impasse Main Effect, and Time Perspective Main Effect with all student analyses.

Some study decisions were made in terms of correlations. Campbell and Stanley (1963) state that such data is relevant to causal hypotheses in that they expose them to disconfirmation. If a zero correlation is obtained the credibility of the hypothesis is lessened. If a high correlation occurs, the credibility of the hypothesis is

	Impasse Effect:	
	Bargaining Impasse	Non-Impasse
Time Perspective: Answered in terms of Autumn, 1972 (The Impasse Situation Year)	1,1 Macomb College Students	2,1 Oakland College Students
Time Perspective: Answered in terms of Autumn, 1973 (One Year Later)	1,2 Macomb College Students	2,2 Oakland College Students

Figure 2. The Sample of Students as They Were Subdivided in this Study.

strengthened in that it has survived a chance of disconfirmation. Correlation does not necessarily indicate causation, but a causal law of the type producing mean differences in the experiments does imply correlation. Kutz, Maccoby and Morse (1951) and Morse and Reimer (1956) utilized such correlational techniques in studying the effects of leadership upon productivity.

In speaking of ex-post facto design, Campbell and Stanley (1963) refer to it as an effort to accomplish a pre-X equation by a process of matching on pre-X attributes. Design errors in this type of study can be avoided through the use of modern statistical methods. Matching variables can all be used as covariates in a multiple-covariate analysis of covariance. It is their opinion that this analysis would remove apparently significant effects.

Macomb and Oakland County

Macomb and Oakland counties share a number of characteristics. Both counties are north of Detroit, Michigan, and have southern boundaries contiguous with that city. Both counties are highly urban, share a common boundary line with each other, and are part of a five-county metropolitan area. Other pertinent statistics cited by the 1970 Census are included as Table 1 (U. S. Department of Commerce, 1972). Oakland County is about twice the size of Macomb County in terms of area. The Macomb County population is slightly denser than that of Oakland County. The counties are nearly equal in terms of their percentage of urban population. Oakland county has a larger percentage

TABLE 1

A COMPARISON OF MACOMB AND OAKLAND COUNTY, MICHIGAN

County	Area in Sq. miles	Population Density Per Sq. Mi.	Percent Urban	Percent of Population Above 18	Median Age in Years	Median School Years Completed	Percentage Unemployed 1970	Per Capita Income
Macomb	480	1,303	92.2	59.1	24.6	12.1	4.8	$3596
Oakland	867	1,047	90.0	62.2	26.7	12.4	5.3	$4496

of the population under eighteen years of age, while also having a slightly higher median population in years. Both counties are nearly equal in the median years of schooling completed for those over twenty-five years of age. Macomb County experienced a slightly lower rate of unemployment in 1970, and had a slightly lower per capita income.

Macomb County Community College

Macomb County Community College is a comprehensive, multi-campus, two-year public institution created by the citizens of Macomb County, Michigan, to provide for the diversified educational, cultural and social needs of a rapidly growing area of that state. As the only institution of higher education within the county, Macomb serves an area of rapidly expanding industrial, commercial and residential development. From an enrollment of 90 students in 1954, student numbers have increased to 18,000 students to make Macomb the largest two-year college and fifth largest of the nearly 70 institutions of higher learning in the state of Michigan. The goals of the institution reflect the goals of the American community college. They are to provide preparation for individuals entering semi-professional, trade and technical occupations; transfer general education, liberal arts and pre-professional programs; vocational, personal, and academic counseling; and community service programs. The college is fully accredited by the North Central Association of Colleges and Secondary Schools which assures acceptance of credit at all degree granting institutions (Macomb County Community College, 1973). Macomb is situated within a county comprised of twelve home rule cities, three villages, and twelve townships. Industry is directly related to automobile production or production of automobile component parts. Aerospace, metal working and other non-automotive industries add diversity. Residential, commercial and industrial worth of the county is estimated by assessed valuation to be 3.2 billion dollars. The population exceeds 660,000 citizens.

Oakland Community College

Oakland Community College is a public, multi-campus institution of higher learning established in Oakland County, Michigan, to provide academic, technical-vocational, and continuing education opportunities for all citizens of the county. The instructional program is designed to prepare students to enter the upper division of senior colleges or universities, or to enter a career field immediately upon completion of training.

The major objective of Oakland Community College is to provide a program of comprehensive services to meet the diverse educational needs of the community. Its open door admissions policy has led to investigation of innovative instructional approaches and effective use of instructional technology to maximize opportunity to acquire higher education.

To meet the wide spectrum of higher education needs in the community, Oakland offers: courses in the major academic disciplines within the liberal arts and sciences for students who wish to transfer to four-year colleges and universities; and courses in the applied and derivative fields such as nursing, pharmacy, and engineering and career education programs for those students who desire to seek immediate employment upon completion of one or two years of college work. Many of the courses in the career program may be transferred to four-year institutions. There are courses in general education designed to facilitate the development of a broadly educated person - one who has a coherent sense of systems of knowledge and is able to think clearly, communicate effectively, make relevant judgments, distinguish among values and make appropriate applications of knowledge. There are counseling and guidance programs that offer assistance in self-evaluation and professional counseling in areas of admissions, education, career, student activities, financial aid, and community guidance. There is a diversified program of community services designed to meet the educational, cultural and recreational needs of the college district. There are developmental programs to assist students with high potential who require strengthening in basic areas prior to undertaking advanced education. Research development and evaluation activities relative to the improvement of teaching are constantly conducted.

The Oakland Community College District was established by the electorate of Oakland County, Michigan, in 1964. The area served encompases nearly 900 square miles and has an assessed valuation of 5.1 billions of dollars. By the fall of 1971, Oakland served over 15,000 students (Oakland Community College, 1973).

The Biology Courses

The general education course in biological science (Biology

100, 4 semester hours credit) at Macomb County Community College is an "introductory lecture and laboratory course in basic principles of biology, stressing the molecular aspects of life and a broad consideration of the morphology, physiology, development, heredity and evolution of all organisms" (Macomb County Community College, 1973, p. 69). The general education course in biological science (Biology 150, 4 semester hours credit) at Oakland Community College helps the student to "investigate biological problems through an examination of the chemical and cellular basis of life metabolic systems, reproduction, genetics, evolution and ecology" (Oakland Community College, 1973, p. 99). A summary of the courses is shown in Table 2.

The Study Population

In September, 1972, there were 673 students enrolled in the introductory general biology course at the South Campus of Macomb County Community College. These students were taught by ten full-time faculty. From the 673 students, one section of 19 students was excluded because they were taught by an instructor from another academic area. Another 94 students of 3 sections were excluded because they comprised the population utilized in the pilot study undertaken in September, 1973. The study was undertaken by mailing an opinionnaire to each of the 560 remaining students, with three follow up mailings occurring within the next two months. Concurrently, at Oakland Community College there were a total of 396 students enrolled in the introductory general biology course. About 90 per cent were enrolled at two campuses of that college taught by seven full-time and two part-time instructors.

TABLE 2

CHARACTERISTICS OF THE INTRODUCTORY BIOLOGY COURSES AT MACOMB AND OAKLAND COMMUNITY COLLEGES

Characteristic	Macomb County Community College	Oakland Community College
Introductory in nature	x	x
Lecture and Laboratory Sessions	x	x
Credit hours given (semester hours)	4	4
Molecular or cellular Aspects of life	x	
Morphology	x	
Physiology	x	
Development	x	
Heredity or Genetics	x	x
Evolution	x	x
Reproduction	x	x
Ecology		x
Stress or emphasis upon audio tutorial activities	x	x

All of the full-time instructors from the two colleges were contacted in person, and given the opinionnaire and subsequently interviewed. The population thus included 956 students and 17 faculty from Macomb and Oakland Community Colleges.

The Variables and Instrumentation

Several questions in Part 1 of the opinionnaire elicited student and faculty biographic information. The faculty biographic variables were:

1. Sex; male = 1, female = 2.
2. Length of time teaching biology; coded in years as 01, 05, 10, etc.
3. Length of teaching service at the institution; coded in years as 01, 05, 10, etc.
4. Education background in terms of degrees; coded as Bachelor's degree = 1, Master's degree = 2, Master's degree with 30 hours beyond = 3, and Ph.D. = 4.

The student biographic variables in Part 1 were:

1. Number of years since high school graduation; coded in years as 01, 02, 05, etc.
2. Sex; male = 1, female = 2.
3. Full or part-time attendance at the institution; coded part-time = 0, full-time = 1.
4. Veteran; coded as non-veteran = 0, veteran = 1.
5. Whether they would continue their education beyond the community college; no = 0, yes = 1.

6. Whether they would enroll at a four-year school or university; no = 0, yes = 1.
7. Whether they intended to major in science; no = 0, yes = 1.
8. The recorded grade they received in the biology course; an A = 4, B = 3, C = 2, D = 1, and any other grade (E, W, I) = 0.

The variables were utilized to compare and contrast the two groups, to study correlational relationships, and as covariates in multivariate analysis of covariance.

The independent variables in the student study were:

1. Extended impasse collective bargaining situation or its absence. This phenomenon existed at Macomb and was absent at Oakland.
2. The time perspective of response. Those who recalled Autumn, 1972 (the impasse semester) and responded in terms of that year, code = 1; those who answered in terms of Autumn, 1973, (one year later), code = 2.

The criterion variables utilized in the study are discussed separately and in detail in the following section.

1. Faculty attitude toward collective bargaining was measured on a thirty item Likert-type scale and by three sets of semantic differential scales pertaining to bargaining impasse, use of sanctions in bargaining, and the use of strikes by teachers.

The collective bargaining scale was used to measure faculty and student attitudes toward collective bargaining. It is a scale modified from one developed originally by Carlton for measuring teacher attitudes toward collective negotiations. This scale was a thirty item, Likert-type scale designed to measure attitudes of teachers toward collective action by teachers. It was based upon the assumptions that attitudes are quantitatively identifiable and can thus be assigned score values; that such attitudes lie along a continuum ranging from strong disfavor to strong favor; that negotiations were composed of two non-separable characteristics, the process and the necessary coercive force to assure equality of the involved parties.

Carlton began with 104 written items, submitted them to a jury of 100 educators who responded and critically analyzed them. Following item analysis, 30 were selected for the final scale. The split-half reliability of the scale was reported as .84 (Carlton, 1966). Moore (1971) at Pennsylvania State University further modified the scale through word substitution, such as using "faculty" to replace "teacher," and "college" to replace "school." These substitutions were made in order to make the scale appropriate for use by community college faculty without seriously altering the individual item validity. A pilot study was run by Moore and the scale was administered to 79 community college faculty. Coefficient alpha (equivalent to the KR-20 formula), a measure of the internal consistency of the scale, was computed as an index of the reliability of the scale and found to be .92. A panel of three judges was asked to make judgments concerning the face validity of the items and to indicate whether the item was a positive or negative statement about collective bargaining. A factor analysis was performed to investigate the unidimensionality and it was determined that the scale was basically measuring one dimension. The reliability index was computed to be .96 for the final form (Moore, 1971). Moore saw three categories of increasingly militant attitudes: collective action, sanctions, and withholding services.

The author of this study further modified the Moore scale by eliminating "I believe," "I think," and "I feel," from the beginning of many sentences and changed "collective negotiations" to "collective bargaining," where appropriate. A five point scale was utilized for scoring the questions (see Table 3): strongly agree = 1, agree = 2, undecided = 3, disagree = 4, and strongly disagree = 5. The questions were coded using these same numbers. The nature of the instrument is such that fifteen questions are written as positive statements and fifteen are written as negative statements toward collective bargaining. Since the individual faculty or student response was scored by determining a summative score on the thirty items it was necessary to reverse the coding of each negative statement (negative statement, strongly agree = 5). The range and interpretation of the scores are shown in Table 3.

Reliability of the instrument in the pilot study was 0.84 and in the major study 0.87 (see Table 4). Additional validity for the scale came from a subsequent BMDO8M factor analysis which derived three bargaining factors given here in order of the percent of variance accounted for: Factor I: Attitude Toward Strikes; Factor III: General Attitude Toward Collective Bargaining; Factor VI: Attitude Toward Use of

TABLE 3

RANGE OF SCORES IN THE COLLECTIVE BARGAINING SCALE

Total Score Range	Interpretation
30-45	Strongly agree with collective bargaining activities.
46-75	Agree with collective bargaining activities.
76-105	Undecided about collective bargaining activities.
106-135	Disagree with collective bargaining activities.
136-150	Strongly disagree with collective bargaining activities.

Range of scores = 30-150, Midpoint = 90.

TABLE 4

RELIABILITY OF THE CARLTON-MOORE COLLECTIVE BARGAINING SCALE

Researcher	Year	Reliability	Method
Carlton	1966	0.84	Split-half method
Moore	1970	0.92	Kuder Richarson Formula 20
Current Pilot Study	1973	0.84	Cronbach Alpha[a]
Current Major Study	1973	0.87	Cronbach Alpha[a]

[a] BMDO2V Analysis of Variance for unbalanced factorial design using Hoyt ANOVA method.

Sanctions. Twenty-five of the thirty individual questions appeared in these three factors. Five of these loaded on more than one of the factors.

The faculty member was asked to respond to three semantic differential items pertaining to bargaining impasse, use of sanctions in bargaining and the use of strikes by teachers. The concepts were presented as a word pair or a short phrase followed by eight bipolar word pairs arranged with seven spaces between the opposite words of each pair.

Osgood and his associates (1965) describe the semantic differential method for measuring the meaning of an object to an individual; its use as an attitude scale thus represents a second application of the technique. In utilizing this method the respondent is asked to rate the attitude object on a series of 7 point bipolar scales. Each item appears as follows:

Object (or Concept)

kind ____ ____ __x__ ____ ____ ____ ____ cruel

The respondent is asked to place an "x" in the position indicating both the direction and intensity of his feeling for the object. Scores are derived by assigning integral weights to each position on the rating scale, and a total score for the concept by summing the sub-parts.

Osgood, Suci and Tannenbaum (1965) using factor analytic procedures, established three general factors of meaning measured by the semantic differential technique: an evaluative factor (good-bad), a potency factor (strong-weak), and an activity factor (fast-slow). The evaluative factor seems to measure the direction and intensity of an individual's attitude toward the object being rated. The bipolar adjective scales having high loadings on this factor are: good-bad, beautiful-ugly, sweet-sour, clean-dirty, tasty-distasteful, valuable-worthless, kind-cruel, pleasant-unpleasant, bitter-sweet, happy-sad, sacred-profane, nice-awful, fragrant-foul, honest-dishonest, and fair-unfair. All have loadings of .75 or better in his work. In actual practice, the number of bipolar items used varies from all fifteen listed above to three of the most clearly evaluative pairs. For greater reliability the score may be computed as a summative score of all scales used.

Relative to other attitude scales, the attributes of the semantic differential appear acceptable. Using five items Osgood and his associates reported test-retest reliabilities ranging from .83 to .91. Jenkins, Russell and Suci reported an average test-retest reliability of .97. Osgood also presented evidence of validity as estimated by correlations with other scales. Correlations with Thurstone scales ranged from .74 to .82. Guttman scales correlated .79 with scores obtained from a three-item semantic differential scale (Shaw and Wright, 1967).

The analysis of semantic differential data has consistently accepted the seven point scale as providing interval data, and so the basis for analysis is the assignment of numbers one through seven to each point. The numbers are assigned so that a one always has the same connotation; in this study, it is always assigned to the positive end of the continuum. In the present study eight word pairs were used in each of the thirteen semantic differential scales: large-small, good-bad, passive-active, weak-strong, fast-slow, worthless-valuable, nice-awful, unfair-fair. The faculty responses were coded by assigning a "1" to the most positive end of the word pairs through "7" to the most negative end of the word pairs. Since some word pairs were reversed, or had the negative word first, these were reverse coded as the opinionnaires were processed. The positive end always received a "1," the negative end always received a "7." The mean response found by summing the eight word pair sets was used as the faculty member or student response to that semantic differential scale (see Table 5).

The reliability figures for the pilot study and the major study are listed in Table 6. Validity was derived from several sources. The phrases used were those most frequently cited in the literature as major elements in the bargaining process. They also appeared in the BMD08M factor analysis as part of the Factor I: Attitudes Toward Strikes.

2. Faculty attitude toward adverse influences upon their teaching effectiveness was measured on three sets of rank order items related to (1) important goals of effective biology teaching in community colleges, (2) those goals of effective teaching most influenced by impasse bargaining situations, and (3) outside influences, including collective bargaining and bargaining impasse, which might have adversely influenced their teaching effectiveness during Autumn, 1972. The rank

TABLE 5

RANGE OF SCORES ON THE SEMANTIC DIFFERENTIAL SCALES

Total Score Range	Interpretation
8-24	Positive attitude toward the concept or phrase
25-40	Undecided attitude toward the concept or phrase
41-56	Negative attitude toward the concept or phrase

Range of scores = 8-56, Midpoint = 32.

TABLE 6

RELIABILITIES OF THE SEMANTIC DIFFERENTIAL SCALES IN THE PILOT STUDY AND THE MAJOR STUDY AS DETERMINED BY THE CRONBACH ALPHA FORMULA

Scale #	Item	Reliability	
		Pilot Study	Major Study
4	Bargaining Impasse	0.87	0.91
7	Sanctions in Bargaining	0.90	0.92
13	Use of Strikes - Teachers	0.85	0.88
1	Fostering Openmindedness	0.77	0.82
2	Valuing Logical Reasoning	0.76	0.84
3	Rejection of Myth	0.89	0.89
5	Scientific Attitudes	0.92	0.89
6	Interaction, Science & Arts	0.89	0.91
8	Science	0.88	0.89
9	Scientific Literacy	0.87	0.90
10	Methods of Science	0.80	0.90
11	Limitations of Science	0.86	0.91
12	Science Part of Modern Living	0.87	0.91
		N = 37	N = 390

order scale offers the respondent a set of concepts or items to be ranked and states a criterion continuum along which they are to be ranked. The respondent was asked to rank the items consecutively, so that one item was assigned to each of the possible ordinal positions. Thus, with eight items to be ranked, the respondent was asked to assign a number to each of the positions 1-8, with a "1" assigned to the most important item, a "2" to the next most important, and so on down to "8," the least important.

The rank order procedures asked the respondent to consider the entire sample of items as a total set and to order within that sample, making distinctions at every point in the ranking, that is, distinguishing the item ranked "8" from the item ranked "7" just as he did the item ranked "2" from the item ranked "1."

In a test-retest effort to establish reliability the researcher learns that the respondents will seldom change their ranking at the extremes, but often vary how they assign the middle or intermediate ranks from one data collection to another (Fox, 1969).

In the present study the author constructed a rank order scale of eight criteria for effective biology teaching. From the literature a set of thirty items was selected and given to a group of community college faculty who judged their relevance by sorting them into three groupings: more important, important and less important criteria for effective teaching. These groupings were utilized by the author to select a group of eight for use in the major study (Table 7). In scale one, the respondent was asked to rank them from 1-8 in terms of importance and

TABLE 7

CRITERIA FOR EFFECTIVE BIOLOGY TEACHING

Academically competent
Good student-teacher relationship
Materials adapted to student abilities
Well organized lectures and laboratories
Adequate learning materials
Interesting lectures and laboratories
Clear assignments and expectations
Positive attitude about teaching biology

in scale two to rank them again in terms of which items were most affected by bargaining impasse at their time perspective of response. An Impact Index, similar to one used by McFadden (1970) in his work on teacher performance, was then derived by computing the rank of each item on scale one times the rank on scale two and including this information in the formula:

$$II = \frac{A - R}{2R}$$

where II = Impact Index; A = the sum of the products of the rankings from 1-8; and R = 36, the sum of 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8. The range of the Impact Index was from 1.17 (the lowest possible ranking) through 1.75 (at mid-range) to 2.33 (the highest possible ranking).

The third rank order scale consisted of eight influences which might have adversely affected teaching-learning at their time perspective of response (see Table 8). The items were selected by the author from a group of twenty-five given to a jury of biologists. They were asked to sort them in the same way as they did the other rank ordering items described earlier. From the groupings the author selected eight for inclusion in the scale. The positional rankings of Collective Bargaining and Bargaining Impasse were analyzed by one way analysis of variance along with the Impact Index. A measure of construct validity was given to the items Collective Bargaining and Bargaining Impasse by their appearance together on Factor IV: Influence of Bargaining Impasse on Learning in the subsequent factor analysis.

3. Faculty attitude toward affective course goals in biology

TABLE 8

POSSIBLE ADVERSE INFLUENCES UPON TEACHING-LEARNING

Collective bargaining
Excessive absence
Foreign wars
Poor student group / Poor instruction (Faculty form only) (Student form only)
National politics
Illness
Emotional problem
Bargaining impasse

was measured by response to ten semantic differential scales pertaining to those goals. The semantic differential scales were composed of ten words or phrases which represented affective goals in biology (see Table 9). They were derived from a search of the literature concerning such goals and were given to a panel of judges prior to the pilot study. They selected ten as being most important from a group of twenty-five such goals. These were coded and scored in exactly the same way as the three semantic differential items described previously in detail under variable number one. The reliability of these items in the pilot study and the major study is shown in Table 6.

4. Student attitude toward collective bargaining was measured on a 30 item Likert-type scale and by three sets of semantic differential scales pertaining to bargaining impasse, use of sanctions in bargaining, and the use of strikes by teachers. The Likert-type scale and the three semantic differential scales have been discussed in detail under variable number one. The students, depending upon their grouping, were asked to respond in terms of how they felt in Autumn, 1972 (the impasse semester), or Autumn, 1973 (one year later).

5. Student attitude toward adverse influences upon their learning effectiveness was measured by three sets of rank order items related to (1) important goals of effective biology teaching in community colleges, (2) those goals of effective teaching most influenced by impasse bargaining situations, and (3) outside influences, including collective bargaining and bargaining impasse, which might have adversely influenced their learning effectiveness during Autumn, 1972. These

TABLE 9

AFFECTIVE COURSE GOALS IN BIOLOGY UTILIZED IN SEMANTIC DIFFERENTIAL SCALES

Fostering of Openmindedness

Valuing Logical Reasoning

Rejection of Myth and Superstition

Scientific Attitudes

Interaction of Science and the Arts

Science

Scientific Literacy

Methods and Procedures of Science

Appreciation of the Limitations of Science

Science as a Basic Part of Modern Living scales were discussed in detail under variable number two. The students in the time perspective one group (the impasse semester) were asked to respond in terms of how they felt in Autumn, 1972, while the time perspective two group was asked to respond in terms of Autumn, 1973 (one year later).

6. Student attitude toward affective course goals in general biology was measured by responses to ten semantic differential scales pertaining to those goals. These scales were discussed in detail under variable number three. The students in the time perspective one group were asked to respond in terms of how they felt in Autumn, 1972 (the impasse semester), while the time perspective two group was asked to respond in terms of Autumn, 1973 (one year later).

7. Student cognitive outcomes expressed as course goals. A "success rate" was computed for each section of classes taught by a Macomb faculty member. The success rate was derived by dividing the total number of A's plus B's plus C's as grades by the total number of students enrolled. The resultant figure or "success rate" is a statistical measure utilized by the administration at Macomb County Community College in its continual evaluation of departmental grades. In the study such success rates were computed for each of the faculty members for whom data was available on a pre-impasse, impasse, post-impasse series of four consecutive autumn semesters. The semesters used were Autumn, 1970, 1971, 1972, and 1973. The impasse occurred during the semester of Autumn, 1972.

Procedures

This study was conducted by means of a mailed opinionnaire in the autumn of 1973, in Macomb and Oakland Counties, Michigan. The instrument, an opinionnaire encompassing four parts and nine pages, was carefully refined before the major study began. A pilot study was conducted with a student group in early September. Opinionnaires for the pilot study were mailed to students enrolled in three of the general introductory biology sections at Macomb Community College, South Campus. These students and sections were subsequently excluded from the major study. Each student was mailed an opinionnaire, an explanatory cover letter, and a stamped self-addressed return envelope (see Appendix A). They were informed of the desire of the author to conduct a study into the relationship of strikes and impasses upon student attitudes and encouraged to return the opinionnaire, completed, at their earliest convenience. Of the 94 contacted students, eight letters were returned by the post office department as undeliverable. Of the remaining 86 students, 37 returned usable opinionnaires by the end of September, a rate of 43.1 percent return. These returns were coded onto data sheets, punched onto cards, and analyzed by computer program. The program BMDO2V, an analysis of variance for unbalanced factorial design, was utilized to compute a Cronbach Alpha coefficient of reliability by the Hoyt ANOVA method for each of the criterion variables. The program BMDX84, which computes large correlation matrices from data with missing values, was utilized to provide means and standard deviations on each criterion variable, as well as a printed correlation matrix (Dixon, editor, 1973). The faculty at the Macomb County Community College, Center Campus had served as judges to validate statements on attitudinal goals in biology which were the basis for the ten semantic differential questions. Upon the basis of these comments, changes were made in the opinionnaire for use both in the pilot study and the major study. Eleven biologists participated in these phases of the study. During August, contact had been established with faculty and administrators at both colleges to acquire permission to continue the study on their college campus, and also to have access to sensitive faculty and student data needed for completion of the study. Permission at both institutions was granted at all levels and cooperation was thorough and complete at Macomb County Community College. Beginning in November, 1973, appointments were scheduled with each full-time faculty member involved in the study and thirty minute interviews were scheduled. The interview followed immediately upon their completion of the faculty opinionnaire. The two part-time instructors at Oakland could not be reached for interviews and were therefore mailed a copy of the opinionnaire and the associated interview questions. Pertinent comments of faculty members were annotated during the interview times.

Cover letters, opinionnaires, and return envelopes were prepared, printed and collated for the final study at this time, and by early November, a packet of materials similar to that used in the pilot study was mailed to all 560 Macomb and 396 Oakland students in the study. As returns arrived at the college, they were identified from their code number on the opinionnaire, coded onto data sheets and stored for future use. Two weeks after the initial mailing, a reminder was mailed to each student for whom no opinionnaire had been received. Ten days later, a second opinionnaire was mailed to each student from whom no response had been received with a new cover letter explaining the need of a response from the student and an exhortation to participate in the study. This occurred in early December, 1973. During the third week in December, a second reminder card was mailed to all students from whom no response had yet been received asking them to help by participating in the study. All additional returns were processed as they were received, until January 17, 1974, the last day of receipt of opinionnaires. That date was used as a cut-off date for this study and no more opinionnaires were received after that date.

During January and February, 1974, the data were key-punched onto cards which were subsequently sorted into usable form. Errors were identified and corrected until the data deck was considered free from all detectable errors. At that point the Beach Program, a program designed by John Beach at the Ohio State University, was run on all student and faculty groups to obtain frequency counts on the various variables in the study as well as to detect any coding errors. Errors again were corrected and the data deck judged ready for the various analysis procedures selected for this study.

The data deck was subdivided into Macomb and Oakland faculty; Macomb students answering in terms of the time perspective of Autumn, 1972, Macomb students answering in terms of the time perspective of Autumn, 1973, and Oakland students answering in terms of the time perspective of Autumn, 1972, and Oakland students answering in terms of the time perspective of Autumn, 1973. A BMDO3D program, correlation with item deletion (Dixon, 1973), was used to derive means and standard deviations on all variables, as well as to derive correlations between them from which a plot could be made. Charts were constructed to show graphically the various correlations and significant variables were chosen for subsequent analysis. The programs, BMDO8M, a factor analysis and BMDO2R, a stepwise regression were utilized to determine the need for covariates and upon that knowledge, decisions were made to complete the analysis by means of one way and two-way analyses of variance and covariance. Factor analysis and stepwise regression were utilized finally to predict student attitudes toward collective bargaining and the attitudinal goals in science (Dixon, 1973; Clyde Computing Service, 1969).

Statistical Analysis

Hypothesis 1: An instructor who taught during an extended impasse collective bargaining situation will express a more negative attitude toward collective bargaining than will an instructor who taught during a non-impasse situation.

Dependent Variables:	Independent Variable:
1. Collective Bargaining Scale Total Score.	1. Impasse bargaining situation versus non-impasse bargaining situation.
2. Semantic Differential attitude scales concerning (a) Bargaining impasse, (b) Use of	

sanctions in bargaining, (c)
Use of strikes by teachers.

Analysis procedure: Clyde MANOVA, one way multivariate and univariate analyses of variance for F-ratios, group means and standard deviations.

Hypothesis 2: An instructor who taught during an extended impasse collective bargaining situation will rank collective bargaining and impasse as more important adverse influences on his teaching effectiveness than will an instructor who taught during a non-impasse situation.

Dependent Variables:	Independent Variable:
1. Rank as an adverse influence of: (a) Collective bargaining, (b) Bargaining impasse.	1. Impasse bargaining situation versus non-impasse bargaining situation.
2. Impact Index.	

Analysis procedure: Clyde MANOVA, one way multivariate and univariate analyses of variance for F-ratios, group means and standard deviations.

Hypothesis 3: A student who enrolled in a class during an extended impasse collective bargaining situation will express a more negative attitude toward collective bargaining than will a student who enrolled during a non-impasse situation.

Dependent Variables:	Independent Variables:
1. Collective Bargaining Scale Total Score.	1. Impasse bargaining situation versus non-impasse bargaining situation.
2. Semantic Differential attitude scales concerning (a)	2. Time perspective of response:

Bargaining impasse, (b) Use of sanctions in bargaining, (c) Use of strikes by teachers.

(a) Autumn, 1972 (impasse semester),

(b) Autumn, 1973 (one year later).

Analysis procedure: Clyde MANOVA, two-way multivariate and univariate analyses of covariance, using Sex as a covariate, for F-ratios, adjusted means, and standard deviations.

Hypothesis 4: A student who enrolled in a class during an extended impasse collective bargaining situation will rank collective bargaining and impasse as more important adverse influences on his learning effectiveness than will a student who enrolled in a class during a non-impasse situation.

Dependent Variables:

1. Rank as an adverse influence of:
   (a) Collective bargaining,
   (b) Bargaining impasse.
2. Impact Index.

Independent Variables:

1. Impasse bargaining situation versus non-impasse bargaining situation.
2. Time perspective of response:
   (a) Autumn, 1972 (impasse semester),
   (b) Autumn, 1973 (one year later).

Analysis procedure: Clyde MANOVA, two way multivariate and univariate analyses of variance for F-ratios, group means, and standard deviations.

Hypothesis 5: An instructor who taught during an extended impasse collective bargaining situation will express a more negative attitude toward affective course goals in biology than will an instructor who taught during a non-impasse situation.

Dependent Variables:

1. Semantic differential scales concerning affective course goals in biology:
    - (a) Fostering of openmindedness,
    - (b) Valuing logical reasoning,
    - (c) Rejection of myth and superstition,
    - (d) Scientific attitudes,
    - (e) Interaction of science and the arts,
    - (f) Science,
    - (g) Scientific literacy,
    - (h) Methods and procedures of science,
    - (i) Appreciation of the limitations of science,
    - (j) Science as a basic part of modern living.

Independent Variable:

1. Impasse bargaining situation versus non-impasse bargaining situation.

Analysis procedure: Clyde MANOVA, one way multivariate and univariate analyses of variance for F-ratios, group means, and standard deviations.

Hypothesis 6: A student who enrolled in a class during an extended impasse collective bargaining situation will express a more negative attitude toward affective course goals in biology than will a student who enrolled in a class during a non-impasse situation.

Dependent Variables:

1. Semantic differential scales concerning affective course goals in biology:
    - (a) Fostering of openmindedness,
    - (b) Valuing logical reasoning,
    - (c) Rejection of myth and superstition,
    - (d) Scientific attitudes,
    - (e) Interaction of science and the arts,
    - (f) Science,
    - (g) Scientific literacy,
    - (h) Methods and procedures of science,
    - (i) Appreciation of the limitations of science,
    - (j) Science as a basic part of modern living.

Independent Variables:

1. Impasse bargaining situation versus non-impasse bargaining situation.
2. Time Perspective of response:
    - (a) Autumn, 1972 (impasse semester),
    - (b) Autumn, 1973 (one year later).

Analysis procedure: Clyde MANOVA, two way multivariate and univariate analyses of covariance, using Years Since High School Graduation, Science Major, and Recorded Grade as covariates, for F-ratios, adjusted group means, and standard deviations.

Hypothesis 7: Macomb County Community College students who enrolled in a class during an extended impasse collective bargaining situation will exhibit a lower success rate than students who enrolled in a class during a non-impasse situation.

Dependent Variable:

1. Success Rate.

Independent Variables:

1. Autumn, 1970; Autumn, 1971, Autumn, 1972 (impasse semester); and Autumn, 1973.
2. Macomb instructors.

Analysis procedure: BMD02V, two way ANOVA for instructors with repeated measures across years.

Hypothesis 8: Relationships exist between and among the student variables such that they could be used to predict the criterion variables.

Criterion Variables:

1. Collective Bargaining Total Score.
2. Semantic differential attitude scales concerning:
   (a) Bargaining impasse,
   (b) Use of sanctions in bargaining,

Predictor Variables:

1. Impasse bargaining situation versus non-impasse bargaining situation.
2. Time perspective of response:
   (a) Autumn, 1972 (impasse semester),
   (b) Autumn, 1973 (one year

(c) Use of strikes by teachers.

3. Rank as in adverse influence of:
    (a) Collective bargaining,
    (b) Bargaining impasse.
4. Impact Index.
5. Semantic differential attitude scales concerning affective course goals in biology:
    (a) Fostering of openmindedness,
    (b) Valuing logical reasoning,
    (c) Rejection of myth and superstition,
    (d) Scientific attitudes,
    (e) Interaction of science and the arts,
    (f) Science,
    (g) Scientific literacy,
    (h) Methods and procedures of science,
    (i) Appreciation of the limitations of science,
    (j) Science as a basic part of

later).

3. How soon the opinionnaire was completed and returned.
4. Years since high school graduation.
5. Sex.
6. Full-time or part-time student.
7. Science major.
8. Recorded grade in biology.
9. Factor V: Educational Aspirations.

modern living.

6. Factor I: Attitude Toward Strikes.
7. Factor II: Attitude Toward Science Goals.
8. Factor III: General Attitude Toward Collective Bargaining.
9. Factor IV: Influence of Bargaining Impasse on Learning.
10. Factor VI: Attitude Toward Use of Sanctions.

Analysis procedure: BMDO8M, factor analysis; BMDO2R, stepwise regression analysis.

CHAPTER IV

ANALYSIS OF THE DATA

This chapter is composed of several parts: the nature of the sample of both faculty and students, the nature of the background variables for the faculty group, the nature of the background variables for the student group and the decisions about covariates made in the light of that background, an analysis of the faculty data by hypothesis, analysis of the student data by hypothesis, and a summary of the results from the data for both faculty and student groups.

The Faculty Sample

Seventeen instructors taught the biology courses from which the student sample was taken, eight at Macomb County Community College and nine at Oakland Community College. Fifteen of these faculty members were full-time instructors and two were part-time instructors. An interview was held and an opinionnaire was completed by each full-time faculty member from both schools. Neither of the part-time faculty members could be personally contacted and an opinionnaire was mailed to each of them along with follow up reminder cards. Neither of the part-time instructors returned the opinionnaires. A brief summarization of the data shows that the instructors were nearly equal in numbers from the two schools (Tables 10-13). There were three times as many male as

TABLE 10

SEX OF THE FACULTY MEMBERS BY INSTITUTION

Sex	Macomb Freq.	Macomb Percentage	Oakland Freq.	Oakland Percentage
Male	5	62.5	6	85.7
Female	3	37.5	1	14.3
Total	8		7	

TABLE 11

FACULTY YEARS OF TEACHING EXPERIENCE BY INSTITUTION

Years of Experience	Macomb Frequency	Macomb Percentage	Oakland Frequency	Oakland Percentage
6	1	12.5	1	14.3
7	3	37.5	1	14.3
8	2	25.0	1	14.3
10			3	43.0
11	1	12.5		
13			1	14.3
25	1	12.5		

TABLE 12

LENGTH OF SERVICE FOR FACULTY BY INSTITUTION

Years of Service	Macomb Frequency	Macomb Percentage	Oakland Frequency	Oakland Percentage
5			1	14.3
6	2	25.0	1	14.3
7	3	37.5	1	14.3
8	3	37.5	3	43.0
10			1	14.3

TABLE 13

EDUCATIONAL LEVEL OF THE INSTRUCTORS BY INSTITUTION

Educational Level	Macomb Frequency	Macomb Percentage	Oakland Frequency	Oakland Percentage
MA	4	50.0	1	14.3
MA + 30 hours	3	37.5	5	71.3
Ph.D.	1	12.5	1	14.3

female instructors. There were more male instructors at Oakland, more female instructors at Macomb. The Oakland faculty had slightly more years of experience, the Macomb faculty had a larger percentage of instructors with more service at the institution. The Macomb faculty had more instructors at the Masters degree level, the Oakland faculty had more hours beyond that level.

The Student Sample

The response rates of the student groups are compared in Table 14. Of the 560 Macomb students who received opinionnaires, 255 or 50.2 percent returned them completed. Of the 396 Oakland students who received opinionnaires, 135 or 42.0 percent returned them completed. These returns resulted in the four groups of students for the study:

137 Macomb Time 1 students (time perspective of response was Autumn, 1972, the semester of the Macomb impasse).

118 Macomb Time 2 students (time perspective of response was Autumn, 1973, one year later).

69 Oakland Time 1 students (time perspective of response was Autumn, 1972, the semester of Macomb impasse).

66 Oakland Time 2 students (time perspective of response was Autumn, 1973, one year later).

In terms of time of response, most responses were received after an opinionnaire was mailed to the student rather than after a reminder card (Table 15). In terms of number of years since high school graduation (Table 16), Macomb students were more quickly enrolled in courses after graduation than were Oakland students, yet had a larger range of

TABLE 14

USABLE STUDENT RESPONSE BY INSTITUTION

Macomb						Oakland					
Time 1[a]			Time 2[b]			Time 1			Time 2		
# Sample	# returns	% returns	# Sample	# returns	% returns	# Sample	# returns	% returns	# Sample	# returns	% returns
280	137	48.8	280	118	42.3	198	69	35.0	198	66	33.4

[a] Answered in terms of the Time Perspective of Autumn, 1972 (the impasse semester).

[b] Answered in terms of the Time Perspective of Autumn, 1973 (one year later).

Population Total	560	Population Total	396
Macomb Total Usable returns	255	Oakland total Usable returns	135
Returned: no address	14	Returned: no address	15
Refused to answer and returned	13	Refused to answer and returned	16
Total response	282	Total response	166
Percentage of Response	50.2	Percentage of Response	42.0

TABLE 15

THE TIME OF RETURN OF THE OPINIONNAIRE BY SAMPLE SUBGROUPS

	Macomb				Oakland			
	Time 1		Time 2		Time 1		Time 2	
Time of Return	No.	%	No.	%	No.	%	No.	%
After first copy of opinionnaire	55	40.1	43	36.4	30	43.5	37	56.1
After first reminder	29	21.2	22	18.6	0		1	1.5
After second copy of opinionnaire	33	24.1	39	33.1	30	43.5	18	27.3
After second reminder	20	14.6	14	11.9	9	13.0	10	15.1

TABLE 16
NUMBER OF YEARS SINCE THE HIGH SCHOOL GRADUATION OF THE STUDENTS AS OF AUTUMN, 1972

	Macomb				Oakland			
	Time 1		Time 2		Time 1		Time 2	
Number of Years	No.	%	No.	%	No.	%	No.	%
0	14	10.2	15	12.7	6	8.7	5	7.6
1	54	39.4	32	27.1	20	29.0	19	28.8
2	33	24.1	44	37.3	14	20.3	12	18.2
3	5	3.7	7	5.9	5	7.3	7	10.6
4	3	2.2	6	5.1	3	4.4	5	7.6
more than 4	28	20.4	10	11.9	21	30.3	18	27.2
range	0-22		0-12		0-32		0-26	

years in its student population. There was a difference in the sex ratio of the two schools with the Macomb sample about equally divided between males and females, while the Oakland sample was composed of a much greater number of male students (Table 17). The Macomb sample had fewer male students than the Macomb population (Table 18) as defined in the 1973 Civil Rights Survey Report. Both schools had about two thirds full-time students to one third part-time students in terms of enrollment, yet the Macomb sample is just the reverse of the Macomb population which is composed of two thirds part-time students and one third full time students (Tables 19, 20). Part of the explanation lies in the fact that day students are preponderately full-time enrollees and most biology classes at both schools are offered in the day time hours. The student intention to continue their education is very large at both schools (Table 21), with at least 90 percent intention to do so expressed by all students. In terms of attendance at a college or university, the response is again large with most students intending to do so (Table 22). The two schools are similar in the intentions of the students to major in science although slightly more Oakland students express that intention (Table 23). There is a difference between the schools in terms of recorded grade with Macomb students scoring higher in their biology courses than do the Oakland students (Table 24). Although most students at both schools would not alter their responses to the opinionnaire if they were asked in terms of the opposite time perspective (Table 25), the Macomb (impasse school) students at Time 2 differ in that twice as many of them would alter their responses if they answered in terms of

TABLE 17

THE SEX OF THE STUDENTS

Response	Macomb				Oakland			
	Time 1		Time 2		Time 1		Time 2	
	No.	%	No.	%	No.	%	No.	%
Male	65	47.5	62	52.5	47	68.1	46	69.7
Female	72	52.6	56	47.5	22	31.9	20	30.3

TABLE 18

SEX OF THE MACOMB POPULATION IN 1973

No. students	Sex	%
9,056	male	58.8
6,347	female	41.2

TABLE 19

PART-TIME OR FULL-TIME STUDENT ENROLLMENT

	Macomb				Oakland			
	Time 1		Time 2		Time 1		Time 2	
Response	No.	%	No.	%	No.	%	No.	%
Part-time	33	24.1	25	21.2	18	26.1	19	28.8
Full-time	104	75.9	92	78.0	51	73.9	47	71.2
No response			1	0.85				

TABLE 20

FULL-TIME AND PART-TIME STUDENT ENROLLMENT OF THE MACOMB POPULATION IN 1973

Status	No.	%
Full-time	5,063	29.0
Part-time	12,370	71.0

TABLE 21

STUDENT INTENTION TO CONTINUE EDUCATION BEYOND THE COMMUNITY COLLEGE

	Macomb				Oakland			
	Time 1		Time 2		Time 1		Time 2	
Response	No.	%	No.	%	No.	%	No.	%
No	9	6.6	10	8.5	7	10.1	4	6.0
Yes	128	93.4	107	90.7	62	89.9	62	94.0
No response			1	.9				

TABLE 22

STUDENT INTENTION TO ATTEND A COLLEGE OR UNIVERSITY

	Macomb				Oakland			
	Time 1		Time 2		Time 1		Time 2	
Response	No.	%	No.	%	No.	%	No.	%
No	17	12.4	20	17.0	7	10.1	5	7.6
Yes	120	87.6	98	83.0	62	89.9	60	91.0
No response							1	1.5

TABLE 23

STUDENT INTENTION TO MAJOR IN A SCIENCE RELATED FIELD

	Macomb				Oakland			
	Time 1		Time 2		Time 1		Time 2	
Response	No.	%	No.	%	No.	%	No.	%
no	74	54.0	53	44.9	30	43.5	25	37.9
yes	63	46.0	64	54.2	38	55.1	40	60.6
no response			1	0.9	1	1.5	1	1.5

TABLE 24

THE GRADE RECEIVED IN THE BIOLOGY COURSE

	Macomb				Oakland			
	Time 1		Time 2		Time 1		Time 2	
Grade	No.	%	No.	%	No.	%	No.	%
A	38	27.7	21	17.8	20	29.0	12	18.2
B	33	24.1	30	25.4	14	20.3	11	16.7
C	32	23.4	36	30.5	10	14.5	15	22.7
D	10	7.3	10	8.5	10	14.5	4	6.1
W/OTHER	20	14.6	20	16.9	14	20.3	23	34.9
NO GRADE			1	0.9	1	1.5	1	1.5

TABLE 25

STUDENT INTENTION TO ALTER HIS RESPONSE IF HE WERE IN THE OTHER GROUP

	Macomb				Oakland			
	Time 1		Time 2		Time 1		Time 2	
Response	No.	%	No.	%	No.	%	No.	%
No	117	85.4	83	70.3	56	81.2	50	75.8
Yes	18	13.1	33	28.0	13	18.8	15	22.8
No response	2	1.5	2	1.7			1	1.5

the impasse semester. Of those who would alter their responses in the Macomb Time 2 group, 75 percent would express a more negative attitude (Table 26).

Equivalence of the Faculty Groups

It was necessary to determine if the groups to be compared were equivalent before the analysis of the faculty hypotheses began. Since all faculty were full-time instructors and all faculty were members of their faculty organization or union these variables were excluded from the tests for equivalence. One way multivariate and univariate analysis of variance was used to test equivalence and to aid in the selection of covariates. The faculty biographic variables utilized were: (1) sex of the faculty member, (2) number of years teaching experience, (3) number of years experience at the college, and (4) educational background in terms of degrees and hours.

Results (Tables 27-28):

1. The two faculties did not differ significantly at the 0.1 level on the multivariate combination of biographic variables.

2. The two faculties did not differ significantly at the 0.05 level for any individual variable on the univariate analyses of variance (Table 28).

3. On the basis of these results (Tables 27-28) the decision was made to utilize an analysis of variance of the faculty criterion variables for hypotheses 1, 2 and 5 without the use of a covariate.

TABLE 26

NATURE OF THE ALTERED RESPONSE

	Macomb				Oakland			
	Time 1		Time 2		Time 1		Time 2	
Response[b]	No.	%	No.	%	No.	%	No.	%
Negative	9	6.6	25	21.2	6	8.7	9	13.6
Positive	9	6.6	8	6.8	7	10.1	5	7.6
No response[a]	119	86.8	85	72.0	56	81.2	52	78.8

[a] "No response" indicates the student answered "No" to the question of Table 21.

[b] The student would respond in a more negative manner than if he were in the other time perspective.

TABLE 27

FACULTY BIOGRAPHIC VARIABLES
MULTIVARIATE ANALYSIS OF VARIANCE
TEST OF INSTITUTION DIFFERENCES

Multivariate Tests of Significance using Wilks Lambda Criterion.

test of roots	F	DFHYP	DFERR	P less than
1 through 1	0.36	4.00	10.00	0.83

Univariate F-tests

Biographic variable	F(1,13)	Mean sq.	P less than
Sex	0.957	0.201	0.346
Years Teaching Biology	0.084	2.001	0.777
Years Service at College	0.217	0.344	0.649
Educational background	1.162	0.525	0.301

TABLE 28

FACULTY BIOGRAPHIC VARIABLES MEANS AND STANDARD DEVIATIONS

Institution	N		Sex	Years Teaching Biology	Years Service at College	Education Background
Macomb	8	M	1.375	9.875	7.125	2.625
		SD	0.518	6.289	0.835	0.744
Oakland	7	M	1.143	9.143	7.429	3.000
		SD	0.378	2.340	1.618	0.577

Equivalence of the Student Groups

The student groups were compared for equivalence using the student biographic variables. This was accomplished by use of two way multivariate and univariate analysis of variance (Tables 29-33). The student biographic variables used were:

Years Since High School Graduation,
Sex,
Full-time or Part-time Student,
Veteran,
Continue Education Beyond the Community College,
Attend a College or University,
Major in Science,
Recorded Grade in Biology.

Test of Impasse by Time Perspective Groups

1. There was no significant difference at the 0.1 level on the multivariate combination of student biographic variables for the interaction effects (Table 29).

2. There were no significant differences at the 0.05 level on any individual biographic variable on the univariate analyses of variance for interaction effects (Table 29).

Test of Equivalence of Time Perspective Groups

1. There was a significant difference at the 0.1 level on the multivariate combination of student biographic variables for the time effects (Table 30).

TABLE 29

STUDENT BIOGRAPHIC VARIABLES
MULTIVARIATE ANALYSIS OF VARIANCE
TEST OF EQUIVALENCE OF IMPASSE BY TIME PERSPECTIVE GROUPS

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less than
1 through 1	0.372	8.000	366.000	0.935

Univariate F-tests

Variable	F(1,373)	Mean Sq.	P less than
Years Since High School Graduation	0.037	0.753	0.847
Sex	0.025	0.006	0.874
Full-time or Part-time Student	0.128	0.024	0.721
Veteran	0.670	0.059	0.414
Continue Education Beyond Community College	1.139	0.084	0.286
Attend a University	0.847	0.091	0.358
Science Major	0.145	0.036	0.704
Recorded Grade in Biology	0.433	0.869	0.511

TABLE 30

STUDENT BIOGRAPHIC VARIABLES
MULTIVARIATE ANALYSIS OF VARIANCE
TEST OF EQUIVALENCE OF TIME PERSPECTIVE GROUPS

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less Than
1 through 1	1.930	8.000	366.000	0.054*

Univariate F-tests

Variable	F(1,373)	Mean Sq.	P less than
Years Since High School Graduation	2.679	54.328	0.103
Sex	0.297	0.071	0.586
Full-time or Part-time Student	0.042	0.008	0.838
Veteran	2.456	0.217	0.118
Continue Education Beyond Community College	0.001	0.000	0.969
Attend a University	0.229	0.025	0.633
Science Major	2.710	0.671	0.101
Recorded Grade in Biology	4.512	9.045	0.034**

* $p \leq .1$
** $p \leq .05$

TABLE 31

STUDENT BIOGRAPHIC VARIABLES
TIME PERSPECTIVE GROUPS
MEANS AND STANDARD DEVIATIONS

Variable	Autumn, 1972 M	Autumn, 1972 SD	Autumn, 1973 M	Autumn, 1973 SD
Years Since High School Graduation	3.71	5.18	3.00	3.85
Sex	1.45	0.50	1.41	0.49
Full-time or Part-time Student	0.76	0.43	0.76	0.43
Veteran	0.08	0.26	0.12	0.33
Education After Community College	0.92	0.27	0.92	0.27
Attend a University	0.89	0.32	0.87	0.34
Science Major	0.50	0.50	0.58	0.50
Recorded Grade in Biology**	2.38	1.43	2.06	1.41
	N = 200		N = 177	

** $p \leq .05$

TABLE 32

STUDENT BIOGRAPHIC VARIABLES
MULTIVARIATE ANALYSIS OF VARIANCE
TEST OF EQUIVALENCE OF IMPASSE GROUPS

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less than
1 through 1	6.102	8.000	366.000	0.001***

Univariate F-tests

Variable	F(1,373)	Mean Sq.	P less than
Years Since High School Graduation	18.278	370.680	0.001***
Sex	12.983	3.105	0.001***
Full-time or Part-time Student	1.217	0.224	0.271
Veteran	2.277	0.201	0.132
Continue Education Beyond Community College	0.053	0.004	0.819
Attend a University	1.728	0.186	0.189
Science Major	2.881	0.713	0.090
Recorded Grade in Biology	4.110	8.238	0.043**

** $p \leq .05$
*** $p \leq .01$

TABLE 33

STUDENT BIOGRAPHIC VARIABLES
IMPASSE GROUPS
MEANS AND STANDARD DEVIATIONS

	Macomb Impasse School		Oakland Non-impasse School	
Variable	M	SD	M	SD
Years Since High School Graduation***	2.65	3.36	4.73	6.11
Sex***	1.50	0.50	1.31	0.46
Full-time or Part-time Student	0.78	0.42	0.73	0.45
Veteran	0.08	0.27	0.13	0.34
Education After Community College	0.92	0.27	0.92	0.28
Attend a University	0.86	0.35	0.91	0.29
Science Major	0.50	0.50	0.60	0.49
Recorded Grade in Biology**	2.33	1.35	2.02	1.55

** $p \leq .05$
*** $p \leq .01$

2. There was a significant difference at the 0.05 level on the univariate analysis of the student biographic variable Recorded Grade in Biology with the Macomb students significantly higher than the Oakland students (Table 31).

Test of Equivalence of Impass Groups

1. There was a significant difference at the 0.01 level on the multivariate combination of student biographic variables for the impasse effect (Table 32).

2. There was a significant difference at the 0.05 level on the univariate analysis of the student biographic variable Recorded Grade in Biology with the Macomb students significantly higher than the Oakland students (Table 33).

3. There was a significant difference at the 0.01 level on the univariate analyses of the student biographic variables Years Since High School Graduation, and Sex. More Oakland students had been longer out of high school, and there were more male students at Oakland than at Macomb.

The samples of students from Macomb and Oakland Community colleges differ significantly in terms of three biographic variables. In terms of time perspective and impasse effect Macomb students had higher grades than Oakland students. In terms of impasse effect, Oakland students have been out of school longer and there were more males in the sample than there were at Macomb.

Correlations of the Student Biographic Variables

To investigate the need for covariates for the analysis of the student criterion variables, the correlations of the student biographic and criterion variables were investigated (Table 34). Due to the number of correlations computed, the significance level was set at 0.01. Five groupings of the criterion variables were identified:

1. Those which correlated with Sex:
    (a) Collective Bargaining Total Score,
    (b) Use of Strikes by Teachers.
2. Those which correlated with Years Since High School Graduation:
    (a) Openmindedness ($p \leq .02$),
    (b) Valuing Logical Reasoning,
    (c) Rejection of Myth and Superstition.
3. Those which correlated with Science Major:
    (a) Scientific Attitudes,
    (b) Interaction of Science and the Arts,
    (c) Science,
    (d) Scientific Literacy,
    (e) Methods and Procedures of Science,
    (f) Science as a Basic Part of Modern Living.
4. Those which correlated with Recorded Grade in Biology:
    (a) Valuing Logical Reasoning,
    (b) Rejection of Myth and Superstition,
    (c) Scientific Attitudes,

TABLE 34

CORRELATIONS OF FOUR STUDENT BIOGRAPHIC VARIABLES WITH THE MAJOR CRITERION VARIABLES

		Biographic Variables			
	Criterion Variables	Yrs Since HS Graduation	Sex	Major in Science	Recorded Grade in Biology
5	Collective Bargaining Total Score	-0.035	*0.175	0.059	-0.008
6	Ranking of Collective Bargaining	-0.005	-0.101	0.018	-0.070
7	Ranking of Bargaining Impasse	-0.052	-0.061	0.081	-0.121
8	Openmindedness	*-0.146	-0.018	0.025	-0.117
9	Valuing Logical Reasoning	*-0.164	0.003	-0.038	*-0.159
10	Rejection of Myth and Superstition	*-0.181	-0.050	-0.052	*-0.180
11	Bargaining Impasse	-0.063	0.083	0.017	0.031
12	Scientific Attitudes	-0.106	-0.037	*-0.329	*-0.193
13	Interaction of Science and Arts	-0.078	-0.037	*-0.228	*-0.190
14	Use of Sanctions in Bargaining	-0.033	0.084	0.087	0.009
15	Science	0.013	-0.116	*-0.280	*-0.236
16	Scientific Literacy	-0.065	-0.047	*-0.278	*-0.230
17	Methods and Procedures of Science	-0.087	-0.050	*-0.252	*-0.195
18	Appreciation of Limitations of Science	-0.120	-0.011	-0.081	-0.016
19	Science as Basic Part of Modern Living	-0.125	-0.025	*-0.259	*-0.198
20	Use of Strikes by Teachers	0.011	* 0.174	0.040	0.020
21	Impact Index	-0.005	0.084	-0.073	-0.017

* 0.148 at .01 level of signifcance

N = 300

(d) Interaction of Science and the Arts,

(e) Science,

(f) Scientific Literacy,

(g) Methods and Procedures of Science,

(h) Science as a Basic Part of Modern Living.

5. Those variables for which there were no correlates.

At this point it was determined if it was necessary to use all of the variables which correlated as covariates in the subsequent analyses. A stepwise regression analysis was undertaken utilizing those four biographic variables and the student criterion variables (Table 35). No new evidence was contributed by these analyses relevant to selecting covariates. The covariates were generally independent.

On the basis of the multivariate analysis of variance, the correlations and the stepwise regression analysis of the student biographic data it was decided to utilize the following biographic variables as covariates in the analyses of the student criterion variables:

1. Hypothesis 3: Student Attitude Toward Collective Bargaining:
   The covariate Sex.
2. Hypothesis 4: Student Attitude Toward Adverse Influences on Learning Effectiveness:
   No covariates.
3. Hypothesis 6: Student Attitude Toward Affective Course Goals in Biology:
   Years Since High School Graduation, Recorded Grade in Biology with four of the variables.

TABLE 35

STEPWISE REGRESSION SUMMARY TABLES OF FOUR STUDENT BIOGRAPHIC VARIABLES WITH THE MAJOR CRITERION VARIABLES

Var #	Criterion Variable	Step #	Variable Entered	Var #	Multiple R	Multiple RSQ	F-value to enter
5	Collective Bargaining Total Score	1	Sex	2	0.1748	0.0305	* 9.3892
		2	Science Major	3	0.1910	0.0365	1.8316
6	Rank of Collective Bargaining	1	Sex	2	0.1011	0.0102	3.0779
		2	Recorded Grade	4	0.1160	0.0135	0.9748
7	Rank of Bargaining Impasse	1	Recorded Grade	4	0.1210	0.0146	4.4254
		2	Science Major	3	0.1548	0.0240	2.8414
8	Openmindedness	1	Years Since High School	1	0.1457	0.0212	* 6.4626
		2	Recorded Grade	4	0.1827	0.0334	* 3.7382
9	Valuing Logical Reasoning	1	Years Since High School	1	0.1639	0.0269	* 8.2296
		2	Recorded Grade	4	0.2231	0.0498	* 7.1533
10	Rejection of Myth and Superstition	1	Years Since High School	1	0.1813	0.0329	*10.1286
		2	Recorded Grade	4	0.2497	0.0623	* 9.3348
11	Bargaining Impasse	1	Sex	2	0.0833	0.0069	2.0838
		2	Years Since High School	1	0.1086	0.0118	1.4556
12	Scientific Attitudes	1	Science Major	3	0.3289	0.1081	*36.1359
		2	Recorded Grade	4	0.3627	0.1315	* 7.9971
13	Interaction of Science and Arts	1	Science Major	3	0.2277	0.0519	*16.3006
		2	Recorded Grade	4	0.2800	0.0784	* 8.5445
14	Use of Sanctions in Bargaining	1	Science Major	3	0.0867	0.0075	2.2570
		2	Sex	2	0.1271	0.0161	2.6062
15	Science	1	Science Major	3	0.2803	0.0786	*25.4088
		2	Recorded Grade	4	0.3460	0.1197	*13.8773
16	Scientific Literacy	1	Science Major	3	0.2783	0.0774	*25.0092
		2	Recorded Grade	4	0.3407	0.1161	*12.9962
17	Methods and Procedures of Science	1	Science Major	3	0.2523	0.0636	*20.2527
		2	Recorded Grade	4	0.3014	0.0908	* 8.8863
18	Appreciation of the Limitations of Science	1	Years Since High School	1	0.1196	0.0143	4.3245
		2	Science Major	3	0.1446	0.0209	2.0045

(Continued on next page)

Table 35 (Continued).

Var #	Criterion Variable	Step #	Variable Entered	Var #	Multiple R	Multi ple RSQ	F-value to enter
19	Science as a Basic Part Modern Living	1	Science Major	3	0.2591	0.0672	*21.4540
		2	Recorded Grade	4	0.3081	0.0949	* 9.1097
20	Use of Strikes by Teachers	1	Sex	2	0.1741	0.0303	* 9.3179
		2	Science Major	3	0.1835	0.0337	1.0248
21	Impact Index	1	Sex	2	0.0839	0.0070	2.1121
		2	Science Major	3	0.1061	0.0113	1.2655

Percentile points of F-distributions:
(1,298) 6.63 at .01 level of significance,
(2,297) 4.61 at .01 level of significance.

* Significant F-value with $p \leq .01$.

Science Major, and Recorded Grade in Biology with six of the variables.

In the portions of the chapter which follow the faculty hypotheses will be discussed as a group and then the student hypotheses will be discussed as a group.

Analysis of the Faculty Hypotheses

Hypothesis 1: There will be no difference in attitude of an instructor who taught during an extended impasse collective bargaining situation and an instructor who taught during a non-impasse situation toward collective bargaining as measured by responses to a thirty-item Likert-type opinionnaire and three semantic differential scales concerning Bargaining Impasse, Use of Sanctions in Bargaining and Use of Strikes by Teachers.

Dependent Variables:

1. Collective Bargaining Scale Total Score.
2. Semantic differential attitude scales concerning
   (a) Bargaining Impasse,
   (b) Use of Sanctions in Bargaining,
   (c) Use of Strikes by Teachers.

Independent Variable:

Impasse bargaining situation versus non-impasse bargaining situation.

Analysis procedure: Clyde MANOVA, one way - two levels, multivariate and univariate analyses of variance for F-ratios, group means and standard deviations. The results are given in Tables 36 and 37.

TABLE 36

FACULTY ATTITUDES TOWARD COLLECTIVE BARGAINING MULTIVARIATE ANALYSIS OF VARIANCE TEST OF IMPASSE MAIN EFFECT

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	RR	P less than
1 through 1	2.668	4.000	10.000	0.095*

Univariate F-tests

Variable	F(1,13)	Mean Sq.	P less than
Collective Bargaining Total Score	0.211	36.459	0.654
Bargaining Impasse	7.695	662.523	0.016**
Use of Sanctions in Bargaining	0.222	13.886	0.645
Use of Strikes by Teachers	0.787	78.630	0.391

* $p \leq .1$
** $p \leq .05$

TABLE 37

FACULTY ATTITUDES TOWARD COLLECTIVE BARGAINING MEANS AND STANDARD DEVIATIONS

Variable	Macomb Impasse school N = 8 M	 SD	Oakland Non-impasse school N = 7 M	 SD
Collective Bargaining Total Score	63.125	13.087	60.000	13.216
Bargaining Impasse**	25.250	11.298	38.571	6.133
Use of Sanctions in Bargaining	21.500	7.251	23.429	8.600
Use of Strikes by Teachers	20.125	10.412	24.714	9.482

** Significant at the .05 level.

A low score on each variable indicates a positive attitude.

Multivariate: Impasse Main Effect	Rejected at the 0.1 level of significance.	
Univariate: Impasse Main Effect		
1. Collective Bargaining Total Score.	Not rejected.	
2. Bargaining Impasse.	Rejected at the .05 level of significance.	Impasse faculty more positive.
3. Use of Sanctions in Bargaining.	Not rejected.	
4. Use of Strikes by Teachers.	Not rejected.	

Discussion:

1. There was a significant difference at the 0.1 level on the multivariate combination of the bargaining variables.

2. Both groups expressed a positive attitude toward collective bargaining as measured by the Collective Bargaining Total Score. The spread of responses is equal in both groups.

3. The faculty members who experienced impasse were significantly more positive in their attitude toward Bargaining Impasse than those who had not experienced impasse. The spread of responses in the impasse school was twice as wide as the non-impasse school.

4. Although not significantly, the faculty who did not experience impasse are more positive toward the Collective Bargaining

Total Score, the faculty who did experience impasse are more positive toward Use of Sanctions in Bargaining and Use of Strikes by Teachers.

Hypothesis 2: There will be no difference between an instructor who taught during an extended impasse collective bargaining situation and an instructor who taught during a non-impasse situation in how they rank Collective Bargaining and Bargaining Impasse as adverse influences on their teaching effectiveness.

Dependent Variables:

1. Importance rank of
    (a) Collective Bargaining,
    (b) Bargaining Impasse as adverse influences on teaching effectiveness.
2. Impact Index.

Independent Variable:

Impasse bargaining situation versus non-impasse situation.

Analysis procedure: Clyde MANOVA, one way - two levels, multivariate and univariate analyses of variance for F-ratios, group means and standard deviations. The results are given in Tables 38 and 39.

Results:

Multivariate: Impasse Main Effect. Not rejected

Univariate: Impasse Main Effect.

1. Ranking of Collective Bargaining. Not rejected

TABLE 38

FACULTY ATTITUDES TOWARD ADVERSE INFLUENCES UPON TEACHING EFFECTIVENESS
MULTIVARIATE ANALYSIS OF VARIANCE
TEST OF IMPASSE MAIN EFFECT

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less than
1 through 1	0.111	3.000	8.000	0.952

Univariate F-tests

Variable	F(1,10)	Mean Sq.	P less than
Collective Bargaining	0.048	0.167	0.830
Bargaining Impasse	0.075	0.375	0.790
Impact Index	0.208	0.023	0.658

TABLE 39

FACULTY ATTITUDES TOWARD ADVERSE INFLUENCES UPON TEACHING EFFECTIVENESS MEANS AND STANDARD DEVIATIONS

	Macomb Impasse school N = 8		Oakland Non-impasse school N = 7	
Variable	N	SD	M	SD
Collective Bargaining	3.750	1.909	3.500	1.732
Bargaining Impasse	2.125	1.808	2.500	3.000
Impact Index	1.714	0.302	1.806	0.386

Lower score on the variables Collective Bargaining and Bargaining Impasse is a more important adverse effect than a higher score.

A higher score on Impact Index reflects a higher impact on teaching.

2. Ranking of Bargaining Impasse.	Not rejected.
3. Impact Index.	Not rejected.

Discussion:

1. There was no significant difference on the multivariate combination of adverse influence variables.

2. There were no significant differences on any of the individual univariate analyses.

3. The non-impasse school faculty show a wider range of response to the variable Bargaining Impasse than did the impasse school faculty.

4. Both groups see Collective Bargaining and Bargaining Impasse as adverse influences on their teaching effectiveness.

Hypothesis 5: There will be no difference between an instructor who taught during an extended impasse collective bargaining situation and an instructor who taught during a non-impasse situation in terms of their attitude toward affective course goals in biology as measured by their responses to ten sets of semantic differential scales concerning affective course goals in biology

Dependent Variables:	Independent Variable:
Semantic differential scales concerning affective course goals in biology.	Impasse bargaining situation versus non-impasse situation.

(a) Fostering Openmindedness,

(b) Valuing Logical Reasoning,

(c) Rejection of Myth and Superstition,

(d) Scientific Attitudes,
(e) Interaction of Science and the Arts,
(f) Science,
(g) Scientific Literacy,
(h) Methods and Procedures of Science,
(i) Appreciation of the Limitation of Science,
(j) Science as a Basic Part of Modern Living.

Analysis procedure: Clyde MANOVA, one way - two level multivariate and univariate analyses of variance for F-ratios, group means, and standard deviations. The results are given in Tables 40 and 41.

Results:

Multivariate: Impasse Main Effect	Rejected at the 0.1 level of significance.
Univariate: Impasse Main Effect	
1. Fostering Openmindedness.	Not rejected.
2. Valuing Logical Reasoning.	Not rejected.
3. Rejection of Myth and Superstition.	Not rejected.

TABLE 40

FACULTY ATTITUDES TOWARD AFFECTIVE COURSE GOALS IN BIOLOGY
MULTIVARIATE ANALYSIS OF VARIANCE
TEST OF IMPASSE MAIN EFFECT

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less than
1 through 1	3.941	10.000	4.000	0.099*

Univariate F-tests

Variable	F(1,13)	Mean Sq.	P less than
Openmindedness	1.439	43.429	0.252
Logical Reasoning	4.063	107.143	0.065
Rejection of Myth & Superstition	3.781	162.976	0.074
Scientific Attitudes	7.335	177.376	0.018**
Interaction of Science & Arts	9.831	196.233	0.008***
Science	12.112	270.867	0.004***
Scientific Literacy	19.835	489.143	0.001***
Methods & Proc. Science	12.185	198.171	0.004***
Appreciation Limitations of Science	2.194	132.804	0.162
Science Basic Part of Modern Living	8.013	118.876	0.014**

* $p \leq .1$
** $p \leq .05$
*** $p \leq .01$

TABLE 41

FACULTY ATTITUDES TOWARD AFFECTIVE GOALS IN BIOLOGY MEANS AND STANDARD DEVIATIONS

Variable	Macomb Impasse School		Oakland Non-impasse School	
	M	SD	M	SD
Fostering Openmindedness	15.88	5.77	19.29	5.16
Valuing Logical Reasoning	15.50	5.66	20.86	4.45
Rejection of Myth & Superstition	15.25	5.52	21.86	7.60
Scientific Attitudes**	13.25	4.03	20.14	5.79
Interaction of Science & Arts***	12.75	4.65	20.00	4.24
Science***	11.63	3.50	20.14	5.84
Scientific Literacy***	12.13	3.72	23.57	6.11
Methods and Procedures of Science***	13.00	4.50	20.29	3.40
Appreciation of Limitations of Science	17.75	9.35	23.71	5.41
Science as Basic Part of Modern Living**	12.50	4.14	18.14	3.49

** $p \leq .05$
*** $p \leq .01$

A lower score indicates a more positive attitude toward the variable.

4.	Scientific Attitudes.	Rejected at the 0.05 level of significance.	Impasse faculty more positive.
5.	Interaction of Science and the Arts.	Rejected at the 0.01 level of significance.	Impasse faculty more positive.
6.	Science.	Rejected at the 0.01 level of significance.	Impasse faculty more positive.
7.	Scientific Literacy.	Rejected at the 0.01 level of significance.	Impasse faculty more positive.
8.	Methods and Procedures of Science.	Rejected at the 0.01 level of significance.	Impasse faculty more positive.
9.	Appreciation of the Limitations of Science.	Not rejected	
10.	Science as a Basic Part of Modern Living.	Rejected at the 0.05 level of significance.	Impasse faculty more positive.

Discussion:

1. There was a significant difference at the 0.1 level on the multivariate combination of the affective course goals variables.

2. The faculty that experienced impasse are significantly more

positive in their attitudes toward Scientific Attitudes, Interaction of Science and the Arts, Science, Scientific Literacy, Methods and Procedures of Science, and Science as a Basic Part of Modern Living.

3. The faculty that experienced impasse were more positive in their attitudes toward Fostering Openmindedness, Valuing Logical Reasoning, and Rejection of Myth and Superstition, Appreciation of the Limitations of Science, but not significantly so.

4. Although not significantly, the impasse faculty were least positive in their attitudes toward Fostering Openmindedness and Appreciation of the Limitations of Science.

Analysis of the Student Hypotheses

Because there were two independent variables each student hypothesis group was analyzed in terms of Impasse effect, Time effect, and Time by Impasse interaction effect. The Impasse effect contrasted the impasse school with the non-impasse school. The Time effect contrasted the Time 1 (Autumn, 1972) students with the Time 2 (Autumn, 1973) students.

Hypothesis 3: There will be no difference between students who enrolled in class during an extended impasse collective bargaining situation and students enrolled in class during a non-impasse situation in their attitude toward collective bargaining as measured by responses to a thirty item Likert type opinionnaire and three semantic differential scales concerning Bargaining Impasse, Use of Sanctions in Bargaining, and Use of Strikes by Teachers.

Dependent Variables:

1. Collective Bargaining Total Score.
2. Semantic differential attitude scales concerning:
   - (a) Bargaining Impasse,
   - (b) Use of Sanctions in Bargaining,
   - (c) Use of Strikes by Teachers.

Independent Variables:

1. Impasse bargaining.
2. Time perspective of response
   - (a) Autumn, 1972 (impasse semester),
   - (b) Autumn, 1973 (one year later).

Analysis procedure: Clyde MANOVA, 2 x 2, two way multivariate and univariate analyses of covariance for F-ratios, adjusted group means and standard deviations.

Test of Equality of Regression

The test of equality of regression indicated the covariate Sex could be used in the analyses. The results of this test are found in Appendix E, Table 67.

Test of Interaction of Impasse by Time Perspective Effect

Multivariate: Impasse by Time Perspective Effects (Table 42). Not rejected.

Univariate: Impasse by Time Perspective Effects

1. Collective Bargaining Not rejected.

TABLE 42

STUDENT ATTITUDE TOWARD COLLECTIVE BARGAINING
MULTIVARIATE ANALYSIS OF COVARIANCE
TEST OF IMPASSE BY TIME PERSPECTIVE INTERACTION EFFECT

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less than
1 through 1	1.949	4.000	362.000	0.102

Univariate F-tests

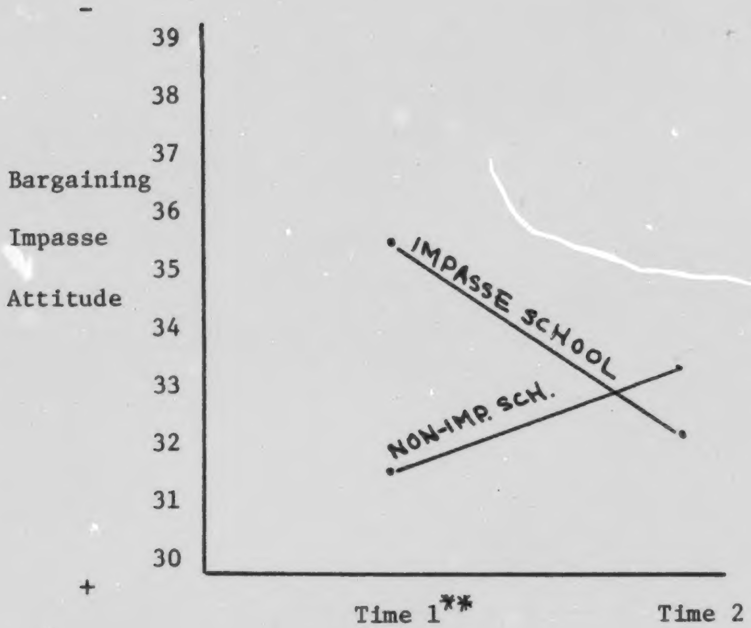
Variable	F(1,365)	Mean Sq.	P less than
Collective Bargaining Total Score	0.388	71.375	0.534
Bargaining Impasse	4.684	543.414	0.031**
Use of Sanctions in Bargaining	1.425	161.105	0.233
Use of Strikes by Teachers	1.454	185.648	0.229

** $p \leq 0.05$

Total Score.		
2. Bargaining Impasse.	Rejected at the 0.05 level of significance.	
(a) t-test between impasse time 1 and non-impasse time 1 students (Figure 3).	t-test significant at the 0.05 level of significance.	Impasse experiencing students more negative.
(b) t-test between impasse time 2 and non-impasse time 2 students.	t-test is not significant.	
3. Use of Sanctions in Bargaining.	Not rejected.	
4. Use of Strikes by Teachers.	Not rejected.	

Test of Impasse Main Effect

Multivariate: Impasse Main Effect (Table 43).	Not rejected.
Univariate: Impasse Main Effect.	
1. Collective Bargaining Total Score.	Not rejected.
2. Bargaining Impasse.	Not rejected.



** t-test significant at the 0.05 level.

Figure 3. Graphic Representation of Impasse by Time Perspective Interaction for Bargaining Impasse Attitude.

TABLE 43

STUDENT ATTITUDE TOWARD COLLECTIVE BARGAINING
MULTIVARIATE ANALYSIS OF COVARIANCE
TEST OF IMPASSE MAIN EFFECT

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less than
1 through 1	0.866	4.000	362.000	0.485

Univariate F-tests

Variable	F(1,365)	Mean Sq.	P less than
Collective Bargaining Total Score	0.306	56.313	0.580
Bargaining Impasse	1.411	163.637	0.236
Use of Sanctions in Bargaining	0.583	65.895	0.446
Use of Strikes by Teachers	0.338	43.176	0.561

3. Use of Sanctions in Bargaining. Not rejected.
4. Use of Strikes by Teachers. Not rejected.

Test of Time Perspective Main Effect

Multivariate: Time perspective Main Effect (Table 44). Not rejected

Univariate: Time Perspective Main Effect.

1. Collective Bargaining Total Score. Not rejected.
2. Bargaining Impasse. Not rejected.
3. Use of Sanctions in Bargaining. Not rejected.
4. Use of Strikes by Teachers. Not rejected.

Discussion:

1. On the variable Bargaining Impasse there was a significant difference between the student groups in terms of Impasse by Time Perspective interactions. The t-tests between the means indicated that the significant difference is between students who had experienced impasse and students who experienced a non-impasse situation and answered in terms of the time of the impasse (Table 42, Figure 3).

2. Bargaining Impasse was the only variable that any student group rated in the negative range. Their responses are in the neutral

TABLE 44

STUDENT ATTITUDE TOWARD COLLECTIVE BARGAINING
MULTIVARIATE ANALYSIS OF COVARIANCE
TEST OF TIME PERSPECTIVE MAIN EFFECT

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less than
1 through 1	1.193	4.000	362.000	0.313

Univariate F-tests

Variable	F(1,365)	Mean Sq.	P less than
Collective Bargaining Total Score	1.861	342.000	0.173
Bargaining Impasse	2.258	261.969	0.134
Use of Sanctions in Bargaining	0.060	6.762	0.807
Use of Strikes by Teachers	2.633	336.242	0.105

range except for a positive attitude toward the Collective Bargaining Total Score.

3. There were no significant differences on any other bargaining variable (Table 45).

4. Although not significantly, students show a moderation in their attitudes toward collective bargaining through time (Table 45).

Hypothesis 4: There will be no difference between a student who enrolled in a class during an extended impasse collective bargaining situation and a student who enrolled in a class during a non-impasse situation in terms of how they rank Collective Bargaining and Bargaining Impasse as more important adverse influences.

Dependent Variables:

1. Rank Importance of:
   (a) Collective Bargaining
   (b) Bargaining Impasse as adverse influences on learning effectiveness.
2. Impact Index.

Independent Variables:

1. Impasse bargaining situation versus non-impasse bargaining situation.
2. Time Perspective of response:
   (a) Autumn, 1972 (Impasse semester).
   (b) Autumn, 1973 (one year later).

Analysis procedure: Clyde MANOVA, 2 x 2, two way multivariate and univariate analyses of variance for F-ratios, group means and standard deviations (Refer to Tables 46-50).

TABLE 45

STUDENT ATTITUDE TOWARD COLLECTIVE BARGAINING ADJUSTED MEANS

Estimates adjusted for 1 covariates

		Criteria		
Contrast: Impasse	CB Total	Bargaining Impasse	Use of Sanctions	Use of Strikes
Impasse school	75.893	33.717	30.464	30.943
Non-impasse school	76.726	32.297	31.365	31.672

		Criteria		
Contrast: Time	CB Total	Bargaining Impasse	Use of Sanctions	Use of Strikes
1972 Impasse time perspective	77.076	34.039	30.890	32.083
1973 Non-impasse time perspective	75.179	32.301	30.652	30.199

		Criteria		
Contrast: Impasse x Time	CB Total	Bargaining Impasse**	Use of Sanctions	Use of Strikes
Impasse school/1972	76.479	35.302	31.032	32.293
Impasse school/1973	75.196	31.828	29.788	29.335
Non-impasse school/1972	78.279	31.492	30.605	31.661
Non-impasse school/1973	75.149	33.114	32.137	31.683

** Significant at the 0.05 level.

Lower score on all variables is a more positive attitude than a higher score.

TABLE 46

STUDENT ATTITUDES TOWARD ADVERSE INFLUENCES UPON LEARNING EFFECTIVENESS
MULTIVARIATE ANALYSIS OF VARIANCE
TEST OF IMPASSE BY TIME PERSPECTIVE INTERACTION EFFECT

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less than
1 through 1	0.597	3.000	304.000	0.618

Univariate F-tests

Variable	F(1,306)	Mean Sq.	P less than
Collective Bargaining	0.631	2.460	0.428
Bargaining Impasse	1.509	6.398	0.220
Impact Index	0.144	0.013	0.704

TABLE 47

STUDENT ATTITUDE TOWARD ADVERSE INFLUENCES UPON LEARNING EFFECTIVENESS
MULTIVARIATE ANALYSIS OF VARIANCE
TEST OF IMPASSE MAIN EFFECT

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less than
1 through 1	6.039	3.000	304.000	0.001***

Univariate F-tests

Variable	F(1,306)	Mean Sq.	P less than
Collective Bargaining	13.906	54.199	0.001***
Bargaining Impasse	9.582	40.634	0.002***
Impact Index	1.921	0.167	0.167

*** $p \leq .01$ level

TABLE 48

STUDENT ATTITUDES TOWARD ADVERSE INFLUENCES UPON LEARNING EFFECTIVENESS
IMPASSE MAIN EFFECT
MEANS AND STANDARD DEVIATIONS

	Macomb Impasse school N = 215		Oakland Non-impasse school N = 95	
	M	SD	M	SD
Collective Bargaining***	4.493	2.200	5.400	2.116
Bargaining Impasse***	4.088	2.233	4.874	2.213
Impact Index	1.880	0.298	1.830	0.289

*** Significant at the .01 level

A lower score on Collective bargaining and Bargaining Impasse is a more important adverse effect than a higher score.

A higher score on Impact Index reflects a higher impact on learning.

TABLE 49

STUDENT ATTITUDE TOWARD ADVERSE INFLUENCES UPON LEARNING EFFECTIVENESS
MULTIVARIATE ANALYSIS OF VARIANCE
TEST OF TIME PERSPECTIVE MAIN EFFECT

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less than
1 through 1	27.925	3.000	304.000	0.001***

Univariate F-tests

Variable	F(1,306)	Mean Sq.	P less than
Collective Bargaining	67.088	261.471	0.001***
Bargaining Impasse	52.788	223.843	0.001***
Impact Index	2.315	0.201	0.129

*** $p \leq .01$

TABLE 50

STUDENT ATTITUDES TOWARD ADVERSE INFLUENCES UPON LEARNING EFFECTIVENESS
TIME PERSPECTIVE MAIN EFFECT
MEANS AND STANDARD DEVIATIONS

	Time 1 Autumn, 1972 N = 152		Time 2 Autumn, 1973 N = 158	
Variable	M	SD	M	SD
Collective Bargaining***	3.809	2.249	5.696	1.733
Bargaining Impasse***	3.441	2.177	5.184	1.983
Impact Index	1.892	0.297	1.838	0.293

*** Significant at the .01 level.

A lower score on Collective Bargaining and Bargaining Impasse is a more important adverse effect than a higher score.

A higher score on Impact Index reflects a higher impact on learning.

Test of Interaction of Impasse by Time Perspective Effect

Multivatiate: Impasse by Time Perspective Effect (Table 46).	Not rejected.	
Univariate: Impasse by Time Perspective Effects.		
1. Rank of Collective Bargaining.	Not rejected.	
2. Rank of Bargaining Impasse.	Not rejected.	
3. Impact Index.	Not rejected.	

Test of Impasse Main Effect

Multivariate: Impasse Main Effect (Table 47).	Rejected at the 0.01 level of significance.	
Univariate: Impasse Main Effect.		
1. Rank of Collective Bargaining.	Rejected at the 0.01 level of significance.	Impasse experiencing students see it as a more important adverse influence.

2. Rank of Bargaining Impasse.	Rejected at the 0.01 level of significance.	Impasse experiencing students see it as a more important adverse influence.
3. Impact Index.	Not rejected.	
Test of Time Perspective Main Effect		
Multivariate: Time Perspective Main Effect (Table 49).	Rejected at the 0.01 level of significance.	
Univariate: Time Perspective Main Effect.		
1. Rank of Collective Bargaining.	Rejected at the 0.01 level of significance.	Time 1 students (year of impasse) see it as a more important adverse influence.
2. Rank of Bargaining Impasse.	Rejected at the 0.01 level of significance.	Time 1 students (Year of impasse) see it as a more important adverse influence.

3. Impact Index. Not rejected.

Discussion:

1. There was a significant difference at the 0.01 level on the multivariate combination of adverse influence variables in terms of Impasse Effect and in terms of Time Perspective Effect. There was no interaction between Impasse by Time Perspective Effects.

2. Students who experienced an impasse situation saw Collective Bargaining and Bargaining Impasse as significantly more important adverse influences on their learning effectiveness than did students who experienced no impasse situation (Table 48).

3. Students who answered in terms of how they felt at the time perspective of the impasse saw Collective Bargaining and Bargaining Impasse as significantly more important adverse influences on their learning effectiveness than did students who answered in terms of how they felt one year later (Table 50).

Hypothesis 6: There will be no difference between a student who enrolled in a class during an extended impasse collective bargaining situation and a student who enrolled in a class during a non-impasse situation in terms of their attitude toward affective course goals in biology as measured by their responses to ten sets of semantic differential scales concerning affective course goals in biology.

Because different combinations of covariates were needed with the affective course goals variables, they were divided into two groupings for the purpose of analysis of covariance. Four of the variables were placed in Group I and analyzed with the covariates:

Years Since High School Graduation, and Course Grade in Biology. Six of the variables were placed in Group II and analyzed with the covariates: Major in Science, and Course grade in Biology.

Dependent Variables Group I:

1. Semantic differential scales concerning affective course goals in biology:
    - (a) Fostering of Openmindedness,
    - (b) Valuing Logical Reasoning,
    - (c) Rejection of Myth and Superstition,
    - (d) Appreciation of the Limitations of Science.

Dependent Variables Group II:

1. Semantic differential scales concerning affective course goals in biology.
    - (a) Scientific Attitudes,
    - (b) Interaction of Science and the Arts,
    - (c) Science,
    - (d) Scientific Literacy,
    - (e) Methods and Procedures of Science,

Independent Variables:

1. Impasse bargaining situation versus non-impasse bargaining situation.
2. Time Perspective of response:
    - (a) Autumn, 1972 (impasse semester).
    - (b) Autumn, 1973 (one year later).

(f) Science as a Basic Part of Modern Living.

Analysis Procedure: Clyde MANOVA, 2 x 2, two way multivariate and univariate analyses of covariance for F-ratios, adjusted group means and standard deviations (Refer to Tables 51-58).

Group I

Test of Equality of Regression

The test of equality of regression indicated that the covariates: Years Since High School Graduation, and Recorded Grade in Biology could be used in the analysis. The results of this test are found in Appendix E, Table 68.

Test of Impasse by Time Perspective Interaction

Multivariate: Impasse by Time Perspective Effect (Table 51).	Not rejected.
Univariate: Impasse by Time Perspective Effects.	
1. Fostering of Open-mindedness.	Not rejected.
2. Valuing Logical Reasoning.	Not rejected.
3. Rejection of Myth and Superstition.	Not rejected.
4. Appreciation of the Limitations of Science.	Not rejected.

TABLE 51

STUDENT ATTITUDES TOWARD FOUR AFFECTIVE COURSE GOALS IN BIOLOGY
MULTIVARIATE ANALYSIS OF COVARIANCE
TEST OF IMPASSE BY TIME PERSPECTIVE INTERACTION EFFECT

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less than
1 through 1	0.911	4.000	362.000	0.457

Univariate F-tests

Variable	F(1,365)	Mean Sq.	P less than
Fostering Openmindedness	0.511	31.383	0.475
Valuing Logical Reasoning	0.952	47.168	0.330
Rejection of Myth and Superstition	0.339	36.668	0.561
Appreciation of the Limitations of Science	1.180	126.379	0.278

Test of Impasse Main Effect

Multivariate: Impasse Main Effect (Table 52).	Rejected at the 0.05 level of significance.	
Univariate: Impasse Main Effect.		
1. Fostering of Open-mindedness.	Rejected at the 0.01 level of significance.	Non-impasse students more positive than impasse students.
2. Valuing Logical Reasoning.	Rejected at the 0.05 level of significance.	Non-impasse students more positive than impasse students.
3. Rejection of Myth and Superstition.	Not rejected.	
4. Appreciation of the Limitations of Science.	Not rejected.	

Test of Time Perspective Main Effect

Multivariate: Time Perspective Main Effect (Table 53).	Not rejected.	

TABLE 52

STUDENT ATTITUDES TOWARD FOUR AFFECTIVE COURSE GOALS IN BIOLOGY
MULTIVARIATE ANALYSIS OF COVARIANCE
TEST OF IMPASSE MAIN EFFECT

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less than
1 through 1	2.511	4.000	362.000	0.042**

Univariate F-teats

Variable	F(1,365)	Mean Sq.	P less than
Fostering Openmindedness	8.611	529.035	0.004***
Valuing Logical Reasoning	5.880	291.223	0.016**
Rejection of Myth and Superstition	0.720	77.891	0.397
Appreciation of the Limitations of Science	0.242	25.949	0.623

** $p \leq .05$
*** $p \leq .01$

TABLE 53

STUDENT ATTITUDES TOWARD FOUR AFFECTIVE COURSE GOALS IN BIOLOGY MULTIVARIATE ANALYSIS OF COVARIANCE TEST OF TIME PERSPECTIVE MAIN EFFECT

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less than
1 through 1	1.450	4.000	362.000	0.217

Univariate F-tests

Variable	F(1,365)	Mean Sq.	P less than
Fostering Openmindedness	4.117	252.926	0.043**
Valuing Logical Reasoning	0.009	0.441	0.925
Rejection of Myth and Superstition	0.368	39.781	0.545
Appreciation of the Limitations of Science	0.175	18.762	0.676

** $p \leq .05$

Univariate: Time Perspective

Main Effect

1. Fostering of Open-mindedness.	Rejected at the 0.05 level of significance.	Time 2 (one year later) students more positive than Time 1 (year of impasse) students.
2. Valuing Logical Reasoning.	Not rejected.	
3. Rejection of Myth and Superstition.	Not rejected.	
4. Appreciation of the Limitations of Science	Not rejected.	

Discussion:

1. There is a significant difference at the 0.05 level on the multivariate combination of affective course goals variables in terms of Impasse Main Effect, but no significant difference in terms of Time Perspective Main Effect or Impasse by Time Perspective Interaction.

2. The students who did not experience bargaining impasse are significantly more positive in their attitude toward Fostering Open-mindedness, and Valuing Logical Reasoning than are students who experienced bargaining impasse (Table 54).

3. The students who answered in terms of the time perspective of Autumn, 1973 are significantly more positive in their attitude toward

TABLE 54

STUDENT ATTITUDES TOWARD FOUR AFFECTIVE COURSE GOALS IN BIOLOGY
MULTIVARIATE ANALYSIS OF COVARIANCE
ADJUSTED MEANS

Estimates adjusted for 2 covariates	Criteria			
	Fostering Openmindedness	Valuing Logical Reasoning	Rejection of Myth and Superstition	Appreciation of Limitations of Science
Contrast: Impasse	***	**		
Impasse school	21.352	19.970	24.034	26.171
Non-impasse school	18.770	18.055	23.044	25.599
Contrast: Time	**			
1972 Impasse time perspective	21.255	19.351	24.007	25.763
1973 Non-impasse time perspective	19.532	19.240	23.325	26.205
Contrast: Impasse x time perspective				
Impasse school/1972	22.318	20.245	24.125	25.564
Impasse school/1973	20.221	19.649	23.928	26.881
Non-impasse school/1972	19.194	17.618	23.779	26.150
Non-impasse school/1973	18.320	18.520	22.262	25.013

** Significant at the .05 level. *** Significant at the .01 level.
A lower score indicates a more positive attitude than does a higher score on all variables.

Fostering Openmindedness than students who reflected back in terms of the time perspective of Autumn, 1972 (Table 54).

4. In general, although not significantly so, students who did not experience bargaining impasse are more positive than students who experienced impasse; and students who answered in terms of their current attitudes are more positive than students who answered in terms of Autumn, 1972.

5. The students of all groups are generally positive in their attitudes toward the affective course goals variables.

Group II

Test of Equality of Regression

The test of equality of regression indicated the covariates Science Major, and Recorded Grade in Biology could be used in the analyses. The results are found in Appendix E, Table 69.

Test of Interaction of Impasse by Time Perspective Effect

Multivariate: Impasse by Time Perspective Effect (Table 55).	Not rejected.
Univariate: Impasse by Time Perspective Effect.	
1. Scientific Attitudes.	Not rejected.
2. Interaction of Science and the Arts.	Not rejected.
3. Science.	Not rejected.

4. Scientific Literacy.	Not rejected.
5. Methods and Procedures of Science.	Not rejected.
6. Science as a Basic Part of Modern Living.	Not rejected.

Test of Impasse Main Effect

Multivariate: Impasse Main Effect (Table 56).	Not rejected.
Univariate: Impasse Main Effect.	
1. Scientific Attitudes.	Not rejected.
2. Interaction of Science and the Arts.	Not rejected.
3. Science.	Not rejected.
4. Scientific Literacy.	Not rejected.
5. Methods and Procedures of Science.	Not rejected.
6. Science as a Basic Part of Modern Living.	Not rejected.

Test of Time Perspective Main Effect

Multivariate: Time Perspective Main Effect (Table 57).	Rejected at the 0.05 level of significance.
Univariate: Time Perspective Main Effect.	

1. Scientific Attitudes.	Not rejected.	
2. Interaction of Science and the Arts.	Rejected at the 0.01 level of significance.	Time 2 (one year later) students more positive than Time 1 (year of impasse).
3. Science.	Not rejected.	
4. Scientific Literacy.	Not rejected.	
5. Methods and Procedures of Science.	Not rejected.	
6. Science as a Basic Part of Modern Living.	Not rejected.	

Discussion:

1. There is a significant difference at the 0.05 level on the multivariate combination of affective course goals variables in terms of Time Perspective Main Effect, but no significant differences in terms of Impasse Main Effect, or Impasse by Time Perspective Interaction.

2. Students who answered in terms of how they felt in Autumn, 1973 were significantly more positive in their attitude toward the variable Interaction of Science and the Arts than were students who recalled how they felt in Autumn, 1972 (Table 58).

3. The students of all groups are generally positive in their attitudes toward the affective course goals variables (Table 58).

TABLE 55

STUDENT ATTITUDES TOWARD SIX AFFECTIVE COURSE GOALS IN BIOLOGY
MULTIVARIATE ANALYSIS OF COVARIANCE
TEST OF IMPASSE BY TIME PERSPECTIVE INTERACTION EFFECT

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less than
1 through 1	0.182	6.000	355.000	0.982

Univariate F-tests

Variable	F(1,360)	Mean Sq.	P less than
Science Attitudes	0.263	18.328	0.609
Interaction of Science & Arts	0.036	3.238	0.850
Science	0.138	8.691	0.711
Scientific Literacy	0.086	6.656	0.770
Methods and Procedures of Science	0.581	46.844	0.447
Science as Basic Part of Modern Living	0.055	4.211	0.814

TABLE 56

STUDENT ATTITUDES TOWARD SIX AFFECTIVE COURSE GOALS IN BIOLOGY
MULTIVARIATE ANALSYIS OF COVARIANCE
TEST OF IMPASSE MAIN EFFECT

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less than
1 through 1	1.002	6.000	355.000	0.424

Univariate F-tests

Variable	F(1,360)	Mean Sq	P less than
Scientific Attitudes	0.256	17.867	0.613
Interaction of Science & Arts	0.465	41.895	0.496
Science	0.946	59.734	0.332
Scientific Literacy	3.061	238.000	0.081
Methods and Procedures of Science	0.251	20.238	0.617
Science as Basic Part of Modern Living	0.057	4.320	0.812

TABLE 57

STUDENT ATTITUDES TOWARD SIX AFFECTIVE COURSE GOALS IN BIOLOGY
MULTIVARIATE ANALYSIS OF COVARIANCE
TEST OF TIME PERSPECTIVE MAIN EFFECT

Multivariate Tests of Significance Using Wilks Lambda Criterion

Test of Roots	F	DFHYP	DFERR	P less than
1 through 1	2.825	6.000	355.000	0.011**

Univariate F-tests

Variable	F(1,360)	Mean Sq.	P less than
Scientific Attitudes	0.137	9.547	0.712
Interaction of Science & Arts	9.614	866.906	0.002***
Science	0.499	31.523	0.480
Scientific Literacy	1.264	98.227	0.262
Methods and Procedures of Science	1.143	92.203	0.286
Science as Basic Part of Modern Living	0.051	3.875	0.822

** $p \leq .05$
*** $p \leq .01$

TABLE 58

STUDENT ATTITUDES TOWARD SIX AFFECTIVE COURSE GOALS IN BIOLOGY
MULTIVARIATE ANALYSIS OF COVARIANCE
ADJUSTED MEANS

Estimates adjusted for 2 covariates	Criteria					
	Scientific Attitudes	Interaction Science Arts	Science	Science Literacy	Methods and Procedures Science	Science Part of Modern Living
Contrast: Impasse						
Impasse school	19.356	23.309	18.032	22.692	21.627	18.266
Non-impasse school	19.825	22.591	17.175	20.980	21.128	18.035
Contrast: Time		***				
1972 Impasse time perspective	19.667	24.532	18.024	21.626	21.937	18.286
1973 Non-impasse time perspective	19.352	21.399	17.408	22.631	20.908	18.072
Contrast: Impasse x time perspective						
Impasse school/1972	19.356	24.680	18.202	22.118	21.853	18.434
Impasse school/1973	19.357	21.701	17.834	23.365	21.361	18.068
Non-impasse school/1972	20.285	24.239	17.671	20.649	22.103	17.993
Non-impasse school/1973	19.344	20.863	16.654	21.328	20.105	18.079

*** Significant at the .01 level.
A lower score on the variables indicates a more positive attitude that a higher score.

Hypothesis 7: There will be no difference in success rate between Macomb County Community College students who enrolled in a class during an extended impasse collective bargaining situation and students who enrolled in a class during a non-impasse situation in terms of individual instructors or individual Autumn semesters.

Dependent Variable:	Independent Variables:
Success Rate.	1. The semesters of (a) Autumn, 1970, (b) Autumn, 1971, (c) Autumn, 1972 (the impasse semester), (d) Autumn, 1973. 2. The six Macomb instructors for whom data is available for those semesters.

Analysis procedure: BMDO2V, two way ANOVA for instructors with repeated measures across years.

Results (Tables 59-60):

1. Instructor success rate.	Rejected at the 0.05 level of significance.
2. Autumn semester success rates.	Not rejected.

Discussion:

1. There is a significant difference at the 0.05 level between

TABLE 59

FACULTY SUCCESS RATE FOR SIX MACOMB INSTRUCTORS
THE FOUR AUTUMN SEMESTERS
ANALYSIS OF VARIANCE FOR FACTORIAL DESIGN

Source of Variation	Degrees of Freedom	Sums of Squares	Mean squares	F-ratic
1 Instructor	5	3675.91303	735.18237	10.14**
2 Year	3	372.83268	124.27756	1.71
Residual	15	1087.32104	72.48807	
Total	23	5136.06641		

DF (5,15) 2.90 at .05 level of significance.

DF (3,15) 3.29 at .05 level of significance.

** Significant at the .05 level.

TABLE 60

FACULTY SUCCESS RATE FOR SIX MACOMB INSTRUCTORS
THE FOUR AUTUMN SEMESTERS
MEAN SUCCESS RATES

Instructor No.	Normal 1970 Autumn	Normal 1971 Autumn	Fac Strike 1972 Autumn	Normal 1973 Autumn	Row Means
1	79.31	76.19	56.38	54.79	66.67
2	62.07	59.02	41.27	56.25	54.65
3	77.36	68.25	71.88	72.31	72.45
4	74.07	90.00	74.60	85.48	81.04
5	76.27	74.74	88.17	64.52	75.92
6	52.00	49.60	46.15	33.93	45.42
Column means	70.18	69.63	63.07	61.21	

the instructor success rates (Tables 59-60).

2. There is no significant difference in success rates between the years (Tables 59-60).

3. From the Figure 4 it can be seen that several trends in instructor grading exist:

(a) One instructor remains essentially stable through the four semesters (#3).

(b) Two instructors have a noticeable downward trend through the four semesters (#6, #1).

(c) Several instructors fluctuate without any apparent trend either upward or downward.

(d) The students of four of the six instructors had a lower success rate during the impasse semester.

(e) The students of two instructors had higher success rates during the impasse semester.

Hypothesis 8: Relationships exist between and among the student variables such that they could be used to predict the criterion variables.

Criterion Variables:

1. Collective Bargaining Total Score.
2. Semantic differential attitude scales concerning:
   (a) Bargaining Impasse,
   (b) Use of Sanctions in

Predictor Variables:

1. Impasse bargaining situation versus non-impasse bargaining situation.
2. Time Perspective of response:
   (a) Autumn, 1972 (impasse semester), or

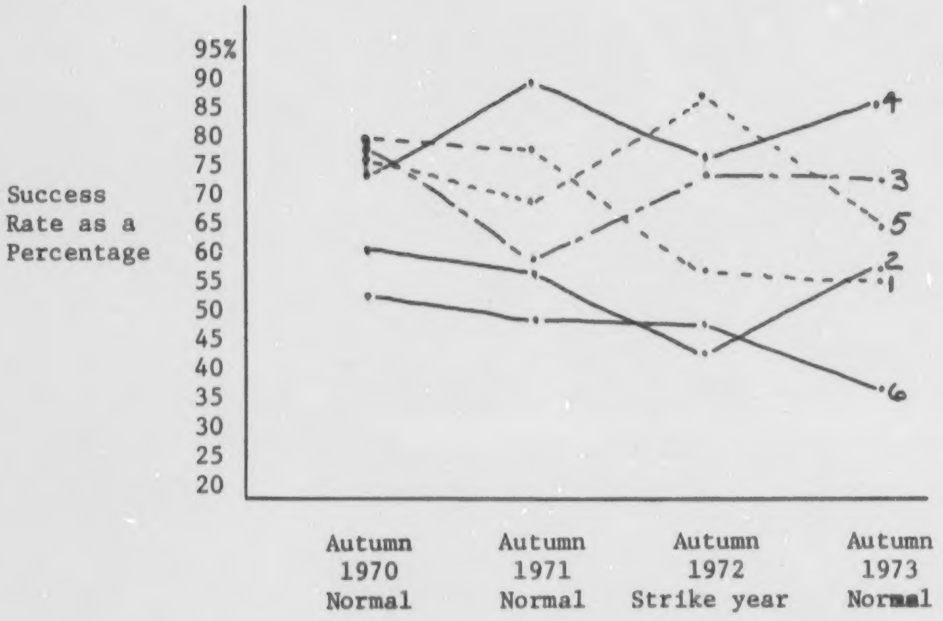


Figure 4. Faculty Success Rate for Six Macomb Instructors. Mean Success Rate by Instructor.

Bargaining,

(c) Use of Strikes by Teachers, Teachers,

3. Ranking as an adverse influence of
    - (a) Collective Bargaining,
    - (b) Bargaining Impasse.
4. Impact Index.
5. Semantic differential attitude scales concerning affective course goals in biology:
    - (a) Fostering Openmindedness,
    - (b) Valuing Logical Reasoning,
    - (c) Rejection of Myth and Superstition,
    - (d) Scientific Attitudes,
    - (e) Interaction of Science and the Arts,
    - (f) Science,
    - (g) Scientific Literacy,
    - (h) Methods and Procedures of Science,
    - (i) Appreciation of the Limitations of Science

(b) Autumn, 1973 (one year later).

3. How soon the opinionnaire was completed and returned.
4. Years Since High School Graduation.
5. Sex.
6. Full-time or part-time student.
7. Science Major.
8. Recorded Grade in Biology.
9. Factor V: Educational Aspirations.

(j) Science as a Basic Part of Modern Living.

6. Factor I: Attitude Toward Strikes.
7. Factor II: Attitude Toward Science Goals.
8. Factor III: General Attitude Toward Collective Bargaining.
9. Factor IV: Influence of Bargaining Impasse on Learning.
10. Factor V: Educational Aspirations.
11. Factor VI: Attitude Toward Use of Sanctions.

Analysis procedure: BMDO2R, stepwise regression analysis and correlational analysis, BMDO8M, factor analysis.

Results of the Correlational Analysis (Tables 61-62)

The significant correlations were divided into four groupings in terms of the major hypotheses: Group 1 dealt with variables concerning attitudes toward collective bargaining, Group 2 dealt with variables concerning attitudes toward adverse influences on student learning, Group 3 dealt with variables concerning attitutes toward affective course goals in biology, and Group 4 were the student biographic variables. The various correlational results are discussed by group in terms of internal correlations within that group, and external

TABLE 61

CORRELATIONS OF THE STUDENT VARIABLES[1]

Variable Name	Var #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Collective Bargaining Total Score	1		22	42	63				17	17										18		
Bargaining Impasse	2			38	36		-18		20	16												
Use of Sanctions in Bargaining	3				48				16													
Use of Strikes by Teachers	4																			17		
Ranking of Collective Bargaining	5						59															
Ranking of Bargaining Impasse	6																					
Impact Index	7																					
Fostering Openmindedness	8									51	19	24	36	26	17	34	23	20	-15			
Valuing Logical Reasoning	9										28	29	38	40	26	38	22	36	-16			-16
Rejection of Myth and Superstition	10											29	17	23	29	29		21	-18			-18
Scientific Attitudes	11												45	60	50	59	33	48			-33	-19
Interaction of Science and the Arts	12													38	40	48	34	34			-23	-19
Science	13														60	63	28	54			-28	-24
Scientific Literacy	14															55	29	46			-28	-23
Methods and Procedures of Science	15																38	49			-25	-20
Appreciation of Limitations Science	16																	29				
Science As Basic Part Modern Living	17																				-26	-20
Years Since High School Graduation	18																					
Sex	19																					14
Science Major	20																					
Recorded Grade in Biology	21																					

N = 300 DF(1,298) 0.148 at the 0.01 level of significance. Source BMD02R

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[1] All correlations were multiplied by 100.

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TABLE 62

MEANS AND STANDARD DEVIATIONS
STUDENT CRITERION AND BIOGRAPHIC VARIABLES

Variable Name	Mean	Standard Deviations
Years Since High School Graduation	3.20	4.19
Sex	1.44	0.50
Science Major	0.51	0.50
Recorded Grade in Biology	2.23	1.41
Collective Bargaining Total Score	76.91	12.84
Ranking of Collective Bargaining	4.73	2.24
Ranking of Bargaining Impasse	4.28	2.27
Fostering Openmindedness	21.06	8.21
Valuing Logical Reasoning	19.63	7.29
Rejection of Myth and Superstition	23.77	10.17
Bargaining Impasse	33.40	10.80
Scientific Attitudes	19.48	8.72
Interaction of Science and Arts	23.26	10.12
Use of Sanctions in Bargaining	30.83	10.62
Science	17.81	8.09
Scientific Literacy	22.50	9.49
Methods and Procedures of Science	21.57	9.27
Appreciation of the Limitations of Science	26.25	10.06
Science as a Basic Part of Modern Living	18.35	8.82
Use of Strikes by Teachers	31.73	11.30
Impact Index	1.86	0.29

N = 300

Source BMD02R

correlations with other groups.

Group 1: Variables Concerning Attitudes Toward Collective Bargaining

The four variables in group I were:

(a) Collective Bargaining Total Score.

(b) Semantic differential: Bargaining Impasse.

(c) Semantic differential: Use of Sanctions in Bargaining.

(d) Semantic differential: Use of Strikes by Teachers.

The four variables were highly intercorrelated, each with every other variable within the group. The correlations ranged from .22 to .63 (Table 61).

Externally, the variable Semantic differential: Bargaining Impasse correlated with the Group 2 Adverse influence variable, Rank of Bargaining Impasse - .18. This indicated that a negative attitude toward Bargaining Impasse indicated a high ranking of Bargaining Impasse as an adverse influence (Tables 61-62).

Externally the variables Collective Bargaining Total Score, Semantic differential: Bargaining Impasse, and Semantic differential: Use of Sanctions in Bargaining correlated with the affective course goals variable: Fostering Openmindedness, all between .16 and .20 (Table 61-62). Those who had favorable attitudes toward collective bargaining also had a favorable attitude toward openmindedness.

The Collective Bargaining Total Score and the Semantic differential: Bargaining Impasse also correlated with the affective course goals variable: Valuing Logical Reasoning, .17 and .16 (Tables 61-62). Those who had favorable attitudes toward Collective Bargaining had a favorable attitude toward Valuing Logical Reasoning.

Externally, the Collective Bargaining Total Score and the Semantic differential: Use of Strikes by Teachers correlated positively with the student biographic variable Sex, .18 and .17 (Tables 61-62). Male students were more favorable toward Collective Bargaining and Use of Strikes by Teachers than were female students.

Group 2: Variables Concerning Adverse Influences on Learning Effectiveness

The three variables in the group were:

(a) Ranking of Collective Bargaining,
(b) Ranking of Bargaining Impasse,
(c) Impact Index.

Ranking of Collective Bargaining and Ranking of Bargaining Impasse were highly correlated, .59. Those who saw Collective Bargaining as an important adverse influence on their learning also saw Bargaining Impasse as a similar adverse influence.

There were no significant external correlations with other groups.

Group 3: Variables Concerning Affective Course Goals in Biology

The ten variables in the group were:

(a) Fostering Openmindedness,

(b) Valuing Logical Reasoning,

(c) Rejection of Myth and Superstition,

(d) Scientific Attitudes,

(e) Interaction of Science and the Arts,

(f) Science,

(g) Scientific Literacy,

(h) Methods and Procedures of Science,

(i) Appreciation of the Limitations of Science,

(j) Science as a Basic Part of Modern Living.

The ten variables were highly intercorrelated within the group ranging from .17 to .63. Every variable correlated with every other variable except Rejection of Myth and Superstition with Appreciation of the Limitations of Science.

Externally, nearly every variable correlated negatively with one or more of the student biographic variables. The correlations ranged from -.15 to -.33.

Fostering Openmindedness correlated with the student biographic variable Years Since High School Graduation -.15. Students who have been out of school longer were more positive toward openmindedness than recent graduates.

Valuing Logical Reasoning and Rejection of Myth and Superstition correlated negatively with the student biographic variables Years Since High School Graduation and Recorded grade in biology. The scores ranged from -.16 to -.18 on both student variables. Students who have been out of school longer and students who had a high grade in biology were more positive in their attitudes toward these variables.

The variables Scientific Attitudes, Interaction of Science and the Arts, Science, Scientific Literacy, Methods and Procedures of Science, and Science as a Basic Part of Modern Living correlated negatively with the student variables Science Major and Recorded Grades in Biology. The scores ranged from -.19 to -.33.

Science Majors and students with higher grades in biology were more positive in their attitudes toward these variables than non-science majors and students with lower grades.

Group 4: Biographic Variables

The four biographic variables were:

(a) Years Since High School Graduation,

(b) Sex,

(c) Science Major,

(d) Recorded Grade in Biology.

The only internal correlation of the student biographic variables was between Sex and Recorded Grade in Biology, .14. Females tended to have higher biology course grades than males.

Results of the Factor Analysis

A BMDO8M factor analysis program was run using all fifty-nine student criterion and biographic variables (Appendix D) with the student group of 300. These 300 students comprised all students who answered every question on the student opinionnaire. Six factors were derived from the analysis (Table 63). The variables included in

TABLE 63

STUDENT CRITERION AND BIOGRAPHIC VARIABLES FACTOR ANALYSIS

Var #	Value	Variable Name
		Factor I: Attitude Toward Strikes
21	0.81	-CBQ10[a], Strikes.
25	0.78	-CBQ14, Strikes.
14	0.77	+CBQ3, Strikes.
42	0.73	Collective Bargaining Total Score.
24	0.72	-CBQ14, Strikes.
36	0.71	-CBQ25, Strikes.
58	0.67	Use of Strikes by Teachers.
19	0.53	-CBQ8, Strikes.
38	0.51	-CBQ27, Sanctions.
52	0.41	Use of Sanctions in Bargaining.
22	0.37	-CBQ11, Bargaining
32	0.35	+CBQ21, Sanctions.
49	0.33	Bargaining Impasse.
34	0.32	+CBQ23, Sanctions.
37	0.31	+CBQ26, Strikes.
33	0.30	+CBQ22, Sanctions.
		Factor II: Attitude Toward Science Goals
55	0.79	Methods and Procedures of Science.
53	0.76	Science.
50	0.73	Scientific Attitudes.
54	0.67	Scientific Literacy.
51	0.63	Interaction of Science and the Arts.
57	0.63	Science as a Basic Part of Modern Living.
47	0.52	Valuing Logical Reasoning.
56	0.45	Appreciation of the Limitations of Science.
46	0.43	Fostering Openmindedness.
10	-0.35	Science Major.
11	-0.29	Recorded Grade in Biology.
		Factor III: General Attitude Toward Collective Bargaining
42	0.68	Collective Bargaining Total Score.
26	0.59	-CBQ15, Bargaining.
23	0.51	-CBQ12, Bargaining.
30	0.51	-CBQ19, Bargaining.
16	0.49	+CBQ5, Bargaining.

(Continued on next page)

Table 63. (Continued)

Var #	Value	Variable Name
41	0.48	+CBQ30, Bargaining.
28	0.47	-CBQ17, Bargaining
18	0.47	-CBQ7, Bargaining.
12	0.44	+CBQ1, Bargaining.
39	0.40	-CBQ28, Bargaining.
29	0.39	+CBQ18, Bargaining.
17	0.38	+CBQ6, Sanctions.
13	0.36	+CBQ2, Bargaining.
20	0.34	-CBQ9, Bargaining.
22	0.33	-CBQ11, Bargaining.
Factor IV: Influence of Bargaining Impasse on Learning		
45	0.74	Ranking of Bargaining Impasse.
44	0.71	Ranking of Collective Bargaining.
2	0.55	Time Perspective of Response.
Factor V: Educational Aspirations		
9	0.81	Attend a College or University.
8	0.76	Continue Education Beyond the Community College.
Factor VI: Attitude Toward Use of Sanctions		
33	0.61	+CBQ22, Sanctions.
34	0.58	+CBQ23, Sanctions.
32	0.54	+CBQ21, Sanctions.
4	0.33	Years Since High School Graduation.

[a] -CBQ10: Negative question number ten about collective bargaining in general.

each factor were those with factor loadings with absolute value of .30 or greater. The factors accounted for 32 percent of the total vairance.

Factor I: Attitude Toward Strikes

On this factor all four major criterion variables concerning collective bargaining are found:

(a) Collective Bargaining Total Score,

(b) Semantic differential: Bargaining Impasse,

(c) Semantic differential: Use of Sanctions in Bargaining,

(d) Semantic differential: Use of Strikes by Teachers.

Also found are:

(e) Six of the eight collective bargaining scale questions relating to strikes,

(f) Six other questions from the collective bargaining scale.

Factor II: Attitude Toward Science Goals

On this factor are found:

(a) Every (10) affective course goals in biology semantic differential scale,

(b) Major in science biographic variable,

(c) Recorded grade biographic variable.

Factor III: General Attitude Toward Collective Bargaining

On this factor are found:

(a) The Collective Bargaining Total Score,

(b) Thirteen of the fifteen collective bargaining scale questions pertaining to collective bargaining,

(c) One other collective bargaining scale question.

Factor IV: Influence of Bargaining Impasse on Learning

On this factor are found:

(a) The time perspective of response variable,

(b) The two Ranking of adverse influence variables Collective Bargaining and Bargaining Impasse.

Factor V: Educational Aspirations

On this factor are found the student biographic variables related to:

(a) Plans to continue education beyond the community college,

(b) Plans to attend a college or university.

Factor VI: Attitude Toward Use of Sanctions

On this factor are found three of the eight questions on the collective bargaining scale pertaining to sanction activities.

Stepwise Regression Analysis

A BMDO2R stepwise regression analysis was run utilizing the following variables to see if any of the independent variables would predict the criterion variables or factors.

Independent Variables:

1. School attended (impasse or non-impasse school),
2. Time perspective of response (Autumn, 1972; Autumn, 1973),

Criterion Variables or Factors

1. Impact Index,
2. Factor I: Attitude Toward Strikes,
3. Factor II: Attitude Toward

3. How quickly the opinionnaire was returned completed,
4. Years since high school graduation,
5. Sex,
6. Full-time or part-time student status,
7. Science Major,
8. Course Grade in Biology.
9. Factor V: Educational Aspirations.

Science Goals,

4. Factor III: General Attitude Toward Collective Bargaining.
5. Factor IV: Influence of Bargaining Impasse on Learning,
6. Factor VI: Attitude Toward Use of Sanctions.

Results (Tables 64-65):

Because more than 90 percent of the students planned to continue their education (94 percent would continue their education beyond the community college and 91 percent indicated they planned to attend a four-year college or university) the Factor IV: Educational Aspirations was disregarded on the stepwise regression analysis and the results are reported here without that Factor.

1. Factor I: Attitude Toward Strikes was predicted by the variable Sex.

2. Factor II: Attitude Toward Science Goals was predicted by the variables Major in Science, Recorded Grade in Biology, and Years Since High School Graduation.

3. Factor III: General Attitude Toward Collective Bargaining was predicted by the variable Sex.

4. Factor IV: Influence of Bargaining Impasse on Learning was

TABLE 64

PREDICTION OF CRITERION VARIABLES FROM COMBINATIONS OF THE STUDENT BIOGRAPHIC VARIABLES
STEPWISE REGRESSION SUMMARY TABLE

Criterion Variable	Variable Entered	Beta Wt.	Multiple		F-value to enter
			R	RSQ	
Factor I: Attitude Toward Strikes	Factor V: Ed. Aspirations	0.98	0.59	0.35	160.45
	Sex	0.87	0.63	0.40	25.28
Factor II Attitude Toward Science Goals	Factor V: Ed. Aspirations	-0.55	0.46	0.21	79.66
	Major in Science	-0.45	0.51	0.26	18.94
	Recorded Grade	-0.14	0.53	0.28	10.48
	Years Since HS Graduation	-0.04	0.55	0.30	9.04
Factor III: General Attitude Toward Collective Bargaining	Factor V: Ed. Aspirations	3.66	0.68	0.46	255.36
	Sex	1.74	0.69	0.48	10.40
Factor IV: Influence of Bargaining Impasse on Learning	Time Perspective of Response	1.09	0.58	0.34	153.68
	Impasse or Non-impasse school	0.49	0.63	0.40	28.73
	Factor V: Ed. Aspirations	0.17	0.67	0.45	25.86
Factor VI: Attitude Toward Use of Sanctions	Factor V: Ed Aspirations	1.68	0.66	0.43	227.51
	Years Since HS Graduation	0.12	0.68	0.46	14.10
	Sex	0.86	0.69	0.48	10.65

DF (1,298) 6.63 at 0.01 level of significance.
DF (2,297) 4.61 at 0.01 level of significance.
DF (3,296) 3.78 at 0.01 level of significance.
DF (4,295) 3.32 at 0.01 level of significance.

All values of the variables are significant at 0.01 level.

TABLE 65

MEANS AND STANDARD DEVIATIONS OF STUDENT VARIABLES USED IN THE STEPWISE REGRESSION

Variable Name	Mean	Standard Deviations
Impasse or Non-Impasse School	1.31	0.47
Time Perspective of Response	1.50	0.50
When Completed Return Received	2.17	1.11
Years Since High School Graduation	3.20	4.19
Sex	1.44	0.50
Full-time or Part-time Student	0.75	0.43
Science Major	0.51	0.50
Recorded Grade in Biology	2.23	1.41
Impact Index	1.86	0.29
Factor I	-0.01	1.89
Factor II	0.00	1.27
Factor III	-0.03	6.34
Factor IV	-0.00	0.94
Factor V	-0.00	1.22
Factor VI	-0.01	3.06

predicted by the variables Time Perspective of Response, and Impasse or Non-impasse School Attended.

5. Factor VI: Attitude Toward Use of Sanctions was predicted by the variables Years Since High School Graduation and Sex.

Discussion:

On Factor I: Attitude Toward Strikes, males were more positive in their attitudes than were females.

On Factor II: Attitude Toward Science Goals, science majors with high grades in biology who had been out of school longer were more positive in their attitudes than were non-science majors with low grades in biology who were recent graduates.

On Factor III: General Attitude Toward Collective Bargaining, males were more positive in their attitudes than were females.

On Factor IV: Influence of Bargaining Impasse on Learning, impasse school students who responded in terms of the time perspective of that impasse saw a greater adverse influence of bargaining impasse on their learning than did non-impasse students who answered in terms of a later time perspective.

On Factor VI: Attitude Toward Use of Sanctions, recent male graduates were more positive than later graduating females.

Summary of the Analyses

The various faculty and student hypotheses were tested in order to gain information relevant to the problem statement:

What is the relationship between the collective bargaining process in the community college and:

(a) the attitudes of the biology instructors toward that process,

(b) the attitudes of the biology instructor toward his own teaching,

(c) the attitudes of students in an introductory general biology course toward that process,

(d) the attitudes of students in an introductory general biology course toward their own learning,

(e) faculty attitudes toward affective course goals in biology,

(f) student attitudes toward affective course goals in biology,

(g) student cognitive outcomes in biology?

This summary of faculty and student results is organized around those various parts of the problem statement.

Attitudes of biology instructors toward the collective bargaining process.

1. Faculty attitudes were positive toward collective bargaining.
2. Faculty who had experienced bargaining impasse were significantly more positive toward bargaining impasse situations than faculty who had not experienced impasse.

Attitudes of biology instructors toward their own teaching.

1. Faculty who experienced an extended impasse collective bargaining situation showed no significant difference in faculty attitudes toward their own teaching effectiveness from those who had not experienced impasse.
2. Both faculty groups viewed Collective Bargaining and Bargaining Impasse as important adverse influences on their teaching effectiveness.

Attitudes of biology instructors toward affective course goals in biology.

1. There was a significant difference in faculty attitudes with faculty who had experienced an impasse collective bargaining situation more positive in their attitudes toward goals than were faculty who had not experienced an impasse situation.

Attitudes of students in an introductory general biology course toward collective bargaining.

1. There was a significant difference in student attitudes toward Collective Bargaining Impasse. The students who had experienced an extended impasse collective bargaining situation more negative than students who had not experienced an impasse situation.
2. Students were generally positive in their attitudes toward the process of collective bargaining.

Attitudes of students in an introductory general biology course toward their own learning effectiveness.

1. There was a significant difference in student attitudes with students who had experienced an extended impasse collective bargaining situation viewing Collective Bargaining and Bargaining Impasse as more important adverse influences on their learning than students who did not experience an impasse.

Attitudes of students in an introductory general biology course toward affective course goals in biology.

1. Students were generally positive in their attitudes toward

affective course goals in biology.

2. There was a significant difference in student attitudes toward Fostering Openmindedness and Valuing Logical Reasoning. The students who had experienced an extended impasse collective bargaining situation were less positive in their attitudes than were students who had not experienced impasse.

Student Cognitive Outcomes in biology in terms of Success Rates for the Macomb faculty.

1. There were no significant Macomb faculty patterns in terms of individual instructors or individual semesters.

Correlations of Student Biographic Variables.

1. Students who had a negative attitude toward bargaining impasse saw that impasse as an important adverse influence on their learning.
2. Students who had a positive attitude toward collective bargaining also viewed Fostering Openmindedness as an important course goal.
3. Students who had a positive attitude toward collective bargaining also viewed Valuing Logical Reasoning as an important course goal.
4. Male students were more favorable toward collective bargaining than were female students.

The Factor Analysis Summary

Six factors were derived from the factor analysis:

Factor I: Attitude toward Strikes.

Factor II: Attitude Toward Science Goals.

Factor III: General Attitude Toward Collective Bargaining.

Factor IV: Influence of Bargaining Impasse on Learning.

Factor V: Educational Aspirations.

Factor VI: Attitude Toward Use of Sanctions.

The Stepwise Regression Summary

Factor I: Attitude Toward Strikes. Males were more positive in their attitudes toward strikes than females.

Factor II: Attitude Toward Science Goals. Science majors with high grades in biology who had been out of school longer were more positive than non-science majors with lower grades who were recent graduates of high school.

Factor III: General Attitude Toward Collective Bargaining: Males were more positive in their attitudes than females.

Factor IV: Influence of Bargaining Impasse on Learning. Students who had experienced impasse and answered in terms of the time perspective when that impasse occurred saw impasse as a greater adverse influence on their learning effectiveness than did non-impasse students who answered in terms of a later time perspective.

Factor VI: Attitude Toward Use of Sanctions. Recent male high school graduates were more positive in their attitudes than later graduating females.

TABLE 66

SUMMARY TABLE OF FACULTY AND STUDENT ATTITUDES

Variable	Multivariate Alpha Level	Univariate Alpha Level	Univariate Direction
1. Faculty Attitudes Toward Collective Bargaining	.10		
(a) Bargaining Impasse		0.05	Impasse school faculty more positive
2. Faculty Attitudes Toward Adverse Influences on Teaching Effectiveness	No significant difference.		
3. Faculty Attitude Toward Affective Course Goals in Biology	0.1		
(a) Scientific Attitudes.		0.05	Impasse faculty are more positive than are non-impasse faculty.
(b) Interaction of Science and the Arts.		0.01	
(c) Science.		0.01	
(d) Scientific Literacy.		0.01	
(e) Methods and Procedures of Science.		0.01	
(f) Science as a Basic Part of Modern Living.		0.05	
4. Student Attitudes Toward Collective Bargaining	Impasse Main Effect No significant difference.		
(a) Bargaining Impasse		I x T Interaction 0.05	Non-Impasse Time 1 Students More positive than Impasse Time 1 Students.
5. Student Attitudes Toward Adverse Influences on Learning Effectiveness.	Impasse Main Effect 0.01		

(Continued on next page)

Table 66. (Continued)

Variable	Multivariate	Univariate	
	Alpha Level	Alpha Level	Direction
(a) Collective Bargaining.		0.01	Impasse school students see as more important adverse influence than non-impasse students.
(b) Bargaining Impasse.		0.01	
6. Student Attitudes Toward Affective Course Goals in Biology	0.05	Impasse Main Effect (Four Goals)	
(a) Fostering Openmindedness.		0.01	Non-impasse students more positive than Impasse students
(b) Valuing Logical Reasoning.		0.05	
7. Student Attitudes Toward Collective Bargaining	No significant difference.	Time Effect	
8. Student Attitudes Toward Adverse Influences on Learning Effectiveness.	0.01	Time Effect	
(a) Collective Bargaining.		0.01	Time 1 Students see as more important adverse influence than do Time 2 Students
(b) Bargaining Impasse.		0.01	
9. Student Attitudes Toward Affective Course Goals in Biology.	0.05	Time Effect (Six Goals)	
(a) Fostering Openmindedness.		0.05	Time 2 students more positive than Time 1 students
(b) Interaction of Science and the Arts.		0.01	

CHAPTER V

SUMMARY AND CONCLUSIONS

This chapter is composed of several parts: an overview of the research study, an interpretation of the results in terms of the problem statement, and conclusions in terms of implications for community college teaching and recommendations for further study.

Overview

Collective bargaining has emerged within the last decade as a potent tool of faculty in Michigan community colleges to help them to bargain with boards of trustees for the improvement of the educational process and conditions. Sometimes those negotiations processes become protracted and lead to faculty strikes and impasse bargaining conditions. This study was designed to determine what relationships exist between the collective bargaining process in the community college and:

(a) the attitudes of the biology instructor toward that process,

(b) the attitudes of the biology instructor toward his own teaching,

(c) faculty attitudes toward affective course goals in biology,

(d) the attitudes of students in an introductory general biology course toward that process,

(e) the attitudes of students in an introductory general biology course toward their own learning,

(f) student attitudes toward affective course goals in biology,

(g) student cognitive outcomes in biology.

To obtain information relevant to this problem statement, eight research hypotheses were generated:

1. An instructor who taught during an extended impasse collective bargaining situation will express a more negative attitude toward collective bargaining than will an instructor who taught during a non-impasse situation.

2. An instructor who taught during an extended impasse collective bargaining situation will rank collective bargaining and impasse as more important adverse influences on his teaching effectiveness than will an instructor who taught during a non-impasse situation.

3. A student who enrolled in a class during an extended impasse collective bargaining situation will express a more negative attitude toward collective bargaining than will a student who enrolled during a non-impasse situation.

4. A student who enrolled in class during an extended impasse collective bargaining situation will see collective bargaining and impasse as more important adverse influences on his learning than will a student who enrolled in a class during a non-impasse situation.

5. An instructor who taught during an extended impasse collective bargaining situation will express a more negative attitude toward affective course goals in biology than will an instructor who taught during a non-impasse situation.

6. A student who enrolled in a class during an extended impasse collective bargaining situation will express a more negative attitude

toward affective course goals in biology than will a student who enrolled in a class during a non-impasse situation.

7. Macomb County Community College students who enrolled in a class during an extended impasse collective bargaining situation will exhibit a lower success rate than students who enrolled in a class during a non-impasse collective bargaining situation.

8. The student attitudinal and cognitive variables can be predicted from a combination of the various biographic characteristics of the students.

The basic plan to secure data in the study was through the use of an opinionnaire responded to by faculty and students of Macomb County Community College and Oakland Community College in the State of Michigan. These schools were selected for the study because Macomb had experienced a faculty strike in September, 1972, followed by an extended period of bargaining impasse. Oakland operated throughout the same semester under the terms of an existing contract and experienced neither strike nor impasse bargaining situation at the time of the study.

An opinionnaire composed of four parts was mailed to all of 560 students who enrolled in an introductory general biology course at Macomb and all 396 students who enrolled in a similar course at Oakland Community College. Part one elicited biographic information about the respondent. Part two was a thirty-item Likert type scale remodified by the author from a scale constructed by Carlton and modified by Moore to measure attitudes toward collective bargaining. Part three consisted of three sets of ranking items designed by the author to measure opinions about the adverse effects of collective bargaining and bargaining impasse on the teaching/learning process. Part four comprised a group of thirteen semantic differential scales designed by the author. Three scales were designed to measure attitudes toward bargaining impasse, sanctions, and teacher strikes. The other ten scales were designed to measure opinions about selected attitudinal goals in general biology courses. Each faculty member who had taught these students was administered the same opinionnaire which differed only in the introductory statements related to each section.

The design of the study was for a research setting from which no data was available prior to exposure to the independent variable of bargaining impasse. The evaluation was done on a post-exposure basis utilizing data from two schools of presumably similar groups who have gone through the same situations except for the independent variable. Data collection occurred after the impasse situation had occurred. The students were randomly selected and placed into subgroups at each school so that Group 1 answered in terms of the time perspective of the impasse semester, 1972. Group 2 answered in terms of the time perspective of Autumn, 1973, one year later. Both schools were so divided yielding four groups, two from each school.

The faculty sample comprised fifteen members, eight from Macomb and seven from Oakland Community College. The student sample was comprised of 255 Macomb students in two groups of 137 and 118; and

135 Oakland students in two groups of 69 and 66. The Macomb response rate was 50.2 percent, the Oakland response rate 42.0 percent of the total student population.

The faculty data were analyzed by Clyde MANOVA one way multivariate and univariate analysis of variance for F-ratios, group means and standard deviations. The student data were analyzed by Clyde MANOVA, 2 x 2, two way multivariate and univariate analysis of variance and covariance for F-ratios, group means, and standard deviations. In addition the student data were further analysed by use of the programs BMD08M for factor analysis and correlational matrix, and BMD02R a stepwise regression analysis.

Interpretation of the Results

Attitudes of biology instructors toward collective bargaining.

All faculty from the impasse and non-impasse conditions were positive in their attitudes toward collective bargaining in terms of such components as the bargaining process, sanction activities and the use of strikes. They differed significantly in their attitudes toward bargaining impasse. Faculty who have experienced bargaining impasse viewed that process positively, faculty who did not experience the process viewed it negatively. It would seem that a faculty which had successful experiences with the collective bargaining process viewed impasse as a part of that process and saw that it contributed to their sense of a successful negotiations process.

These findings are similar in nature to findings in other recent research. Moore (1970) found Pennsylvania community college faculty favorable toward the collective bargaining process. The most favorable faculty group was composed of those faculty who were young, non-Protestant, liberal, male, and holding low faculty rank or were without tenure. Carlton (1966) found North Carolina public school teachers favorable toward the process of collective bargaining with male teachers more positive in their attitudes than female teachers and male principals more positive than female principals. In the current study, male faculty tended to be more positive than female faculty toward collective bargaining, and faculty with fewer years experience teaching biology were more positive than faculty with more years of experience.

Attitudes of biology instructors toward their own teaching effectiveness.

Faculty members who had experienced an extended impasse collective bargaining situation showed no significant difference in attitude toward their own teaching effectiveness than faculty who had not experienced impasse. Although they did not differ significantly in their attitude they saw collective bargaining and bargaining impasse as important adverse influences on their teaching effectiveness. It would appear that because they saw the bargaining process as important adverse influences they actively attempted to keep those processes from entering the classroom. In the interviews of faculty the Macomb biologists felt that the most important effect from the impasse was in the shortened semester length and the need to adjust their teaching to meet that situation. All faculty felt the impasse situation did not enter the classroom or affect what they did there in terms of instructional procedures. There was not one faculty member who felt he had to compensate in the classroom for the climate of impasse. These comments are interesting when contrasted with the fact that these same faculty viewed the impasse as an adverse influence on their teaching effectiveness.

Attitudes of faculty toward affective course goals in biology.

There was a significant difference in faculty attitudes with those faculty who had experienced extended impasse more positive toward those goals than faculty who had not experienced an impasse bargaining situation. It would seem again that some compensatory process occurred so that faculty tried to do a better or more effective teaching job because they were under a bargaining impasse strain. Several faculty members commented in the interviews that they felt a need to be better organized that semester because of the impasse situation. Both faculty groups viewed the affective course goals positively regardless of the significant difference between their attitudes.

An alternative explanation for the difference would be that the affective course goals tested were more representative of the values of Macomb than they were of Oakland. At neither school is there a strong emphasis to foster such affective course goals and although faculty expressed the view that they did foster the goals, they did not feel that they strongly emphasized them. Both groups are also active in their professional organization, the Association of Community College Biologists, a consortium of faculty from fifteen southeastern Michigan community colleges. The Association has had a strong influence on these faculties in terms of course content, course goals and curriculum.

This is an influence which has tended to bring an homogeneity to the biology curricula of these schools rather than to foster a strong diversity.

Attitudes of students in an introductory general biology course toward collective bargaining.

Student attitudes toward collective bargaining in general were positive. They were neutral in their attitudes toward sanctions and the use of strikes. The groups differed significantly in their attitudes toward bargaining impasse with students who had experienced that impasse negative in their attitudes and students who had not experienced impasse neutral in their attitude.

These findings conflict with the findings of other researchers. Blendinger (1969) found that Michigan high school students did not support strikes as a means of improving education, did not think teachers should violate the law by striking and did not feel that the quality of their education had been improved because of the strike. Swanson (1972) found that elementary school children in Los Angeles, California opposed teacher strikes, with younger elementary school children more opposed than older elementary school children, and girls more opposed to strikes than boys.

In this present study male students were more positive in their attitudes toward collective bargaining than females. This information was derived not only from the correlational analysis but also from the stepwise regression analysis for *Factor III: Attitude toward Collective Bargaining*. Male students were more positive towards strikes than were female students according to the stepwise regression analysis for Factor I: Attitudes Toward Strikes. Male students were more positive than female students in terms of the use of sanctions according to the stepwise regression analysis for Factor VI: Attitudes Toward Use of Sanctions.

The student correlational data analysis also showed that students who had a less positive attitude toward collective bargaining impasse saw that impasse as an important adverse influence on their learning.

The moderation of student attitudes toward collective bargaining in general could be a function of the age of the students with college freshmen and sophomores exhibiting a more positive attitude than younger students and young children. It could also be a function of the changing climate of the United States in terms of student attitudes toward such adversary processes as those encompassed within the phenomenon of collective bargaining.

Attitudes of students in an introductory general biology course toward their own learning effectiveness.

There was a significant difference in student attitudes toward collective bargaining and bargaining impasse as important adverse influences on their learning effectiveness. Students who had experienced an extended impasse bargaining situation viewed collective bargaining and bargaining impasse as more important adverse influences than did students who had not experienced an impasse situation. Also, students who answered in terms of the time perspective of response of the impasse semester, Autumn, 1972, saw those same adverse influences as more important than did students who answered in terms of the time perspective of Autumn, 1973, one year after the impasse. This adds emphasis to the findings when one couples this statement with the fact that 28 percent of the Macomb (impasse school) students who answered in terms of how they felt in 1973, one year after the impasse, stated they would respond differently to the opinionnaire if they were to answer in terms of 1972, the impasse semester. Three quarters of these students said they would answer more negatively. An extended impasse collective bargaining situation was seen as an important adverse influence by students in spite of their generally positive attitude toward collective bargaining in general.

Attitudes of students toward affective course goals in biology.

There was a significant difference in student attitudes toward affective course goals in biology. Students who had experienced an extended impasse collective bargaining impasse were less positive in their attitudes toward Fostering Openmindedness and Valuing Logical Reasoning than were students who had experienced no impasse situation. This is a significant finding of the study. Students were generally positive in their attitudes toward affective course goals in biology yet differed significantly on two important goals. Openmindedness and logical reasoning would appear to be two attributes missing from the actions of faculty, administration and boards of trustees when collective bargaining reaches the impasse situation. Students apparently perceived this and those who experienced an extended impasse were significantly less positive in their attitudes toward these important goals. The correlational studies show that students who had a positive attitude toward collective bargaining also viewed Fostering Openmindedness and Valuing Logical Reasoning as important course goals. Here the findings are in contrast with the faculty findings. Impasse faculty were more positive than non-impasse faculty toward affective course goals yet impasse experiencing students were less positive in their attitudes than non-impasse experiencing students.

In spite of faculty claims that the impasse did not affect what went on in the biology classroom, the students reacted less positively toward exactly the attributes apparently lacking in an impasse bargaining situation. Once again the time perspective data reinforces the impasse data. Students who answered in terms of the time perspective of the impasse (Autumn, 1972) were less positive in their attitude toward Fostering Openmindedness than were students who answered in terms of the time perspective of 1973, one year after the impasse.

Implications

The implications of the study concern two important areas: the process of collective bargaining in all its aspects, and the classroom atmosphere under such conditions as bargaining impasse. Teachers view collective bargaining as a positive force to improve their professional working conditions and view even its most extreme form - extended impasse - in a positive sense when they participate in the phenomenon. Moore explains some of this when he states that the

> emergence of teacher militancy is related to the 'professionalization' of teachers. Inherent in the professional role are

> expectations for considerable control over the conditions of employment and participation in institutional governance. In situations where these expectations are not fulfilled, faculty are likely to be frustrated by feelings of powerlessness (Moore, 1970, p. 147).

The process of negotiations is a crucial aspect of the problem. Creal (1970) explains that community colleges are influenced by the history of their negotiations. If the previous negotiation rounds were resolved easily, the grievances which were not completely corrected continue to simmer and build until one year when they demand attention, and the severity of negotiations thus increases. Often an impasse results. Generally one round of severe negotiations will be followed by a less intense negotiating round. Consequently, if serious impasse occurs in one round of bargaining, negotiations should be easier the following round.

The important parameter is the negotiating process itself. The best intentions and the most favorable attitudes do not go far unless accompanied by a knowledge of and a skill in the art of negotiating. Negotiating is an act which requires an understanding of psychology, economics, and the special characteristics of the institution being represented. It also demands communication skills and a good sense of timing. These skills and understandings are as critical in educational negotiations as they are in industrial bargaining. The better the expertise and skill of the bargainers, the more the influence will be toward peaceful negotiations.

Williams (1968) in a work cited earlier in this study listed five components of power potential:

1. Employees must be irreplaceable.
2. Employees must be critical components of the operation of the organization.
3. The cost of disagreement to the employer must exceed the cost of agreement.
4. The employees must be acutely aware that they possess these strengths.
5. They must have the militancy and cohesiveness to exert effective pressure on the employer.

Any group which possesses these components has enormous bargaining power. The question of whether the group has the legal right to bring their power to bear on a situation through the use or threatened use of a strike or sanction becomes largely academic. In few instances have teacher unions been punished effectively for striking even though the right to strike is consistently denied public employees by law or precedent in all fifty states.

Creal (1970) predicted the 1972 Macomb County Community College strike. His dissertation analyzed procedures used by Michigan community college faculties, administrators and boards of trustees to bargain for contracts. He states that

> the relatively low ranking [of Macomb] in the area of attitude plus the continuation of such issues as an acknowledged lack of involvement of the faculty in the governance of the college and the limited resources available could predict further difficulties in negotiations (Creal, 1970; p. 239).

Since the strike as a tool of economic bargaining power is going to remain as an effective weapon of bargaining faculty, the quality of negotiations becomes an important aspect of the prevention of impasse bargaining situations.

A second important implication is the classroom atmosphere during an impasse situation in collective bargaining. The faculty administration and board of trustees all need to know that students attitudes can be related to the atmosphere of collective bargaining. It appears that the faculty at the impasse school of this study attempted to prevent intrusion of the impasse into the classroom atmosphere, yet students still viewed the impasse as an adverse influence on their learning effectiveness. Impasse experiencing students were more negative in their attitudes toward openmindedness and logical reasoning than were non-impasse students. The question that needs to be asked is: "How enduring is the change in attitude?" Rokeach (1960) relates that all belief-disbelief systems serve two powerful and conflicting sets of motives simultaneously: the need for a cognition framework to know and understand and the need to ward off threatening aspects of reality. He proposes that for most persons in most situations both sets of needs operate together to one degree or another. A person will be open to information insofar as possible, and will reject it, screen it out, or alter it insofar as necessary. How lasting then is the student attitude toward openmindedness and the valuing of logical reasoning?

Rokeach (1968) discusses the relationships among attitude change, expressed opinion change and behavior change. There is an absence of research and theoretical thinking about the effect of attitude change on subsequent behavior. In typical experiments the post-test is given only once, usually within a short time after the experimental treatment; thus the meaning of the expressed opinion change in relation to attitude changes is highly equivocal. The lack of studies showing behavioral changes following an attitude change reinforce the belief that most studies on opinion change do not deal with attitude change, but with superficial opinion change. The moderation through time of the less-positive attitude of students toward the variable Valuing Logical Reasoning tends to confirm this idea. Yet, the Impasse student attitude toward Openmindedness, although moderated by time still remains essentially parallel to the change of the non-impasse students. This would lead one to suspect that at the present time a gap remains (Figure 5, 6).

The question still remains whether more faculty concern about affective course goals during an impasse situation would not moderate the adverse influence of bargaining impasse on such attitudes. The study has shown that aspects of our society (in this case the adversary conditions of collective bargaining) do have an influence on science, at least in terms of attitudes of students toward several important affective goals. Since the impasse is germane to the biology course, why not deal with the situation in class and attempt to show the students how openmindedness and logical reasoning have or have not been utilized in the bargaining situation?

Recommendations

1. Faculty, administrators and boards of trustees should consider the implications of this present study to further negotiations and should adjust their procedures so that they will minimize the probability of an impasse situation occurring in the future bargaining procedures

they undertake.

2. Faculty should become aware of the implications of the adverse influence of impasse bargaining situations on student attitudes toward their own learning effectiveness under such conditions. A conscious attempt should be made at all levels of faculty, administration and boards of trustees to actively prevent the intrusion of the impasse into the classroom atmosphere.

3. Faculty, administrators and boards of trustees should be aware that students perceive the collective bargaining process as a positive phenomenon. With this knowledge all the involved negotiating groups should be better able to channel their energy into making the bargaining process as effective as they possibly can in their own unique collective bargaining situation.

4. It would be of value to undertake a broader study of faculty and student attitudes toward collective bargaining in general, strikes and impasse situations. Such background items of the faculty as years of teaching experience, sex, faculty rank, years of tenure at the institution, union affiliations, and age should be considered. Among students such additional variables as age, union affiliation and union affiliation of the parents should be considered. By including urban, suburban, rural school settings and counties a base line of attitudes for faculty and students could be established. These could be used for comparison in measurement of strikes and impasse situations which later occur.

5. The Macomb and Oakland Community College sample should be reexamined in Autumn, 1974 to determine what influence, if any, time

had upon the moderation of the student attitudes toward bargaining in general, strikes, impasse situations and also such important affective course goals as fostering openmindedness and valuing logical reasoning.

6. Other academic disciplines such as humanities, communications and the social sciences should be examined to determine to what extent collective bargaining activities influence affective course goals.

APPENDIX A

INSTRUMENTS

Examples of Instrument Items

1. Likert-type scale question:

Faculty should be able to organize and bargain collectively.

SA	A	U	D	SD
	X			

2. Forced choice ranking items:

7 Collective Bargaining

1 Excessive absence

5 Foreign Wars

4 National Politics

2 Poor Instruction

6 Illness

8 Emotional Problem

3 Bargaining Impasse

3. Semantic differential item:

SCIENCE

large		X						small
good			X					bad
passive							X	active
weak						X		strong

PILOT STUDY
TIME PERSPECTIVE OF AUTUMN, 1972

STUDENT OPINIONNAIRE

I.

1. Number of years since high school graduation (as of last September, 1972) ________.
2. Were you then draft eligible ________.
3. Male ______ or female ______.
4. Were you a full-time ______ or part-time ______ student.
5. Veteran ______ or non-veteran ______.
6. Did you plan to continue your education beyond the community college: yes ______ no ______.
7. Did you plan to transfer to a four-year school: yes ______ no ______.
8. Did you plan to major in science: yes ______ no ______.
9. How did you rate as a student: A ____ B ____ C ____ D ____ E ____.
10. How did you rate as a science student: A ____ B ____ C ____ D ____ E ____.

II.

Please take several minutes to reflect back to Autumn, 1972. The following questions pertain to how you felt at that time in regard to several aspects of your learning environment as a college student in general biology. Please answer every question quickly, by utilizing the answer which best suits the question.* Answer according to how you felt about them in Autumn, 1972. Your answers will remain strictly confidential. Underline any words which you do not understand, or you feel are ambiguous or confusing to you. For your benefit, an IMPASSE is a bargaining situation where neither side will agree so that progress can continue. A SANCTION is a form of coercion used by a teacher group to make the other side agree to their demands. A STRIKE is a withholding of services by a teacher group when bargaining breaks down.

*Utilize SA (strongly agree), A (agree), U (undecided), D (disagree), SD (strongly disagree) to answer each of the following:

	SA	A	U	D	SD
1. Collective negotiations is an effective way for faculty to participate in determining the conditions of their employment.					
2. Collective negotiations is an effective way for faculty to limit the unilateral authority of the governing board.					

	SA	A	U	D	SD
3. Faculty members should be able to withhold their services (when satisfactory agreement between their organization and the governing board cannot be reached).					
4. Collective negotiations should if possible omit the threat of withholding services.					
5. Faculty members should be able to organize freely and to bargain collectively in their working conditions.					
6. Faculty organizations at local, state, and national levels should publicize unfair practices by a governing board through the media such as TV, radio, newspapers, and magazines.					
7. Collective negotiations is primarily a coercive technique that will have detrimental effects on higher education.					
8. Strikes on the part of faculty members are an undesirable aspect of collective negotiations.					
9. Militant faculty organizations are made up of a large number of malcontents and misfits.					
10. Faculty members should not strike in order to enforce their demands.					
11. Good faculty members can always get the salary they need without resorting to collective negotiations.					
12. Collective bargaining alias collective negotiations, is beneath the dignity of college faculty members.					
13. Strikes, sanctions, boycotts, mandated arbitration or mediation are improper procedures to be used by public junior college faculty who are dissatisfied with their conditions of employment.					
14. A faculty member cannot withhold his services without violating professional ethics and trust.					
15. Collective negotiations is an infringement on the authority of the governing board and should be resisted.					
16. Collective negotiations is a good way to unite the teaching profession into a powerful political body.					
17. Collectively negotiated written labor agreements place undesirable restrictions on the administration.					

	SA	A	U	D	SD
18. Collective negotiations can provide a vehicle whereby faculty members gain greater on-the-job dignity and independence in performing their functions.					
19. The many leaders in the drive for collective negotiations are power seekers who do not have the best interests of education at heart.					
20. The local faculty organization should seek to regulate standards for hiring of new faculty members.					
21. Faculty members have a right to impose sanctions on governing boards under certain circumstances.					
22. Sanctions are a step forward in acceptance of faculty responsibility for self-discipline and for insistence upon conditions conducive to an effective program of education.					
23. Sanctions are a means of improving educational opportunities and eliminating conditions detrimental to professional service.					
24. Censure by means of articles in professional association journals, special study reports, newspapers, or other mass media is a legitimate technique for faculty use.					
25. The traditional position that faculty members, as public employees, may not strike is in the best interest of public higher education					
26. The services of the faculty are not so necessary to the public welfare as to necessitate the forfeiture of the right of faculty to strike.					
27. Any faculty sanction or other coercive measure is completely unprofessional.					
28. It is unwise to establish educational policies and practices through collective negotiations.					
29. When the governing board denies the requests of the faculty, the faculty has a right to present the facts to the public and to their professional associates employed in other colleges.					
30. Collective negotiations can bring greater order and system to education.					

III.

1. List below in rank order (most important first through least important last) 4-6 factors which make biology teaching successful by an instructor.

____

____

____

____

____

____

2. If any of the above were adversely affected by collective bargaining or impasse during Fall, 1972, list them in rank order (most affected first through least affected last).

____

____

____

____

____

______________________________ You may list "none was affected"

3. The following is a list of factors or influences which might have adversely influenced your classroom performance during Fall Semester, 1972. Rank them in order of most important to least important as they affected your classroom performance during that semester (assign a number 1 to the most important, a number 2 to the next most important, number 11 to the least important). Please assign a number to each.

______ Collective bargaining.
______ Excessive absence.
______ Personal illness.
______ Vietnam war.
______ Presidential election.
______ Poor instructor.
______ Family illness.
______ Dollar crisis.
______ An emotional problem.
______ Bargaining impasse.
______ Administrative harrassment.

IV.

On the following pages there is either a word or an expression in capitalized letters followed by pairs of opposite words underneath the capitalized word or expression. Most pertain to the teaching of attitudes in biology, several to bargaining. Between each of the pairs of opposites there are seven dashes. You are to place a check mark on one of the 7 positions that are between the two opposite words. The check mark should indicate how you feel about the word or concept. Look at the example below:

Example: EDUCATION

good _X_:___:___:___:___:___:___ bad
slow ___:_X_:___:___:___:___:___ fast
cruel ___:___:___:___:___:_X_:___ kind

On the following place your check marks rapidly. What is wanted is your first impression. There are no "right" or "wrong" answers. Be sure to make only one check for each pair of words. Do not skip any words.

---

1. FOSTERING OF OPENMINDEDNESS

large ___:___:___:___:___:___:___ small
good ___:___:___:___:___:___:___ bad
passive ___:___:___:___:___:___:___ active
weak ___:___:___:___:___:___:___ strong
fast ___:___:___:___:___:___:___ slow
worthless ___:___:___:___:___:___:___ valuable
nice ___:___:___:___:___:___:___ awful
unfair ___:___:___:___:___:___:___ fair

2. VALUING LOGICAL REASONING

fair ___:___:___:___:___:___:___ unfair
valuable ___:___:___:___:___:___:___ worthless
active ___:___:___:___:___:___:___ passive
nice ___:___:___:___:___:___:___ awful
strong ___:___:___:___:___:___:___ weak
small ___:___:___:___:___:___:___ large
slow ___:___:___:___:___:___:___ fast
good ___:___:___:___:___:___:___ bad

3. REJECTION OF MYTH AND SUPERSTITION

large ___:___:___:___:___:___:___ small
good ___:___:___:___:___:___:___ bad
unfair ___:___:___:___:___:___:___ fair
weak ___:___:___:___:___:___:___ strong
active ___:___:___:___:___:___:___ passive
awful ___:___:___:___:___:___:___ nice
slow ___:___:___:___:___:___:___ fast
valuable ___:___:___:___:___:___:___ worthless

4. BARGAINING IMPASSE

strong ___:___:___:___:___:___:___ weak
fast ___:___:___:___:___:___:___ slow
awful ___:___:___:___:___:___:___ nice
valuable ___:___:___:___:___:___:___ useless
small ___:___:___:___:___:___:___ large
unfair ___:___:___:___:___:___:___ fair
good ___:___:___:___:___:___:___ bad
passive ___:___:___:___:___:___:___ active

5. SCIENTIFIC ATTITUDES

bad ___:___:___:___:___:___:___ good
large ___:___:___:___:___:___:___ small
weak ___:___:___:___:___:___:___ strong
nice ___:___:___:___:___:___:___ awful
active ___:___:___:___:___:___:___ passive
fast ___:___:___:___:___:___:___ slow
unfair ___:___:___:___:___:___:___ fair
worthless ___:___:___:___:___:___:___ valuable

6. INTERACTION OF SCIENCE AND THE ARTS

good ___:___:___:___:___:___:___ bad
active ___:___:___:___:___:___:___ passive
awful ___:___:___:___:___:___:___ nice
small ___:___:___:___:___:___:___ large
fair ___:___:___:___:___:___:___ unfair
fast ___:___:___:___:___:___:___ slow
worthless ___:___:___:___:___:___:___ valuable
weak ___:___:___:___:___:___:___ strong

7. USE OF SANCTIONS IN BARGAINING

weak ___:___:___:___:___:___:___ strong
passive ___:___:___:___:___:___:___ active
good ___:___:___:___:___:___:___ bad
fast ___:___:___:___:___:___:___ slow
nice ___:___:___:___:___:___:___ awful
useless ___:___:___:___:___:___:___ valuable
fair ___:___:___:___:___:___:___ unfair
large ___:___:___:___:___:___:___ small

8. SCIENCE

unfair ___:___:___:___:___:___:___ fair
passive ___:___:___:___:___:___:___ active
strong ___:___:___:___:___:___:___ weak
nice ___:___:___:___:___:___:___ awful
slow ___:___:___:___:___:___:___ fast
valuable ___:___:___:___:___:___:___ worthless
bad ___:___:___:___:___:___:___ good
large ___:___:___:___:___:___:___ small

9. SCIENTIFIC LITERACY

large ___:___:___:___:___:___:___ small
strong ___:___:___:___:___:___:___ weak
awful ___:___:___:___:___:___:___ nice
slow ___:___:___:___:___:___:___ fast
worthless ___:___:___:___:___:___:___ valuable
good ___:___:___:___:___:___:___ bad
passive ___:___:___:___:___:___:___ active
unfair ___:___:___:___:___:___:___ fair

10. METHODS AND PROCEDURES OF SCIENCE

active ___:___:___:___:___:___:___ passive
bad ___:___:___:___:___:___:___ good
slow ___:___:___:___:___:___:___ fast
valuable ___:___:___:___:___:___:___ worthless
strong ___:___:___:___:___:___:___ weak
small ___:___:___:___:___:___:___ large
nice ___:___:___:___:___:___:___ awful
fair ___:___:___:___:___:___:___ unfair

11. APPRECIATION OF THE LIMITATIONS OF SCIENCE

weak ___:___:___:___:___:___:___ strong
fair ___:___:___:___:___:___:___ unfair
small ___:___:___:___:___:___:___ large
active ___:___:___:___:___:___:___ passive
worthless ___:___:___:___:___:___:___ valuable
awful ___:___:___:___:___:___:___ nice
bad ___:___:___:___:___:___:___ good
fast ___:___:___:___:___:___:___ slow

12. SCIENCE AS A BASIC PART OF MODERN LIVING

weak ____:____:____:____:____:____:____ strong

awful ____:____:____:____:____:____:____ nice

fast ____:____:____:____:____:____:____ slow

large ____:____:____:____:____:____:____ small

valuable ____:____:____:____:____:____:____ worthless

good ____:____:____:____:____:____:____ bad

fair ____:____:____:____:____:____:____ unfair

13. USE OF STRIKES BY TEACHERS

large ____:____:____:____:____:____:____ small

good ____:____:____:____:____:____:____ bad

passive ____:____:____:____:____:____:____ active

weak ____:____:____:____:____:____:____ strong

fast ____:____:____:____:____:____:____ slow

worthless ____:____:____:____:____:____:____ valuable

nice ____:____:____:____:____:____:____ awful

unfair ____:____:____:____:____:____:____ fair

V.

Would you answer part II differently if you were answering in terms of how you feel today: yes ______ no ______.

PILOT STUDY
TIME PERSPECTIVE OF AUTUMN, 1973

STUDENT OPINIONNAIRE

I.

1. Number of years since high school graduation (as of last September, 1972) _______.
2. Were you then draft eligible ________.
3. Male ______ or female ______.
4. Were you a full-time ______ or part-time ______ student.
5. Veteran ______ or non-veteran ______.
6. Did you plan to continue your education beyond the community college: yes ______ no ______.
7. Did you plan to transfer to a four-year school: yes ______ no ______.
8. Did you plan to major in science: yes ______ no ______.
9. How did you rate as a student: A ____ B ____ C ____ D ____ E ____.
10. How did you rate as a science student: A ____ B ____ C ____ D ____ E ____.

II.

Please take several minutes to reflect upon how you feel about collective bargaining. These questions pertain to how you feel now in regard to several aspects of your learning environment as a college student. Please answer every question quickly, by utilizing the answer which best suits the question.* Your answers will remain strictly confidential. Underline any words which you do not understand, or you feel are ambiguous or confusing to you. For your benefit, an IMPASSE is a bargaining situation where neither side will agree so that progress can continue. A SANCTION is a form of coercion used by a teacher group to make the other side agree to their demands. A STRIKE is a withholding of services by a teacher group when bargaining breaks down.

*Utilize SA (strongly agree), A (agree), U (undecided), D (disagree), SD (strongly disagree) to answer each of the following:

	SA	A	U	D	SD
1. Collective negotiations is an effective way for faculty to participate in determining the conditions of their employment.					
2. Collective negotiations is an effective way for faculty to limit the unilateral authority of the governing board.					

	SA	A	U	D	SD
3. Faculty members should be able to withhold their services (when satisfactory agreement between their organization and the governing board cannot be reached).					
4. Collective negotiations should if possible omit the threat of withholding services.					
5. Faculty members should be able to organize freely and to bargain collectively in their working conditions.					
6. Faculty organizations at local, state, and national levels should publicize unfair practices by a governing board through the media such as TV, radio, newspapers, and magazines.					
7. Collective negotiations is primarily a coercive technique that will have detrimental effects on higher education.					
8. Strikes on the part of faculty members are an undesirable aspect of collective negotiations.					
9. Militant faculty organizations are made up of a large number of malcontents and misfits.					
10. Faculty members should not strike in order to enforce their demands.					
11. Good faculty members can always get the salary they need without resorting to collective negotiations.					
12. Collective bargaining alias collective negotiations, is beneath the dignity of college faculty members.					
13. Strikes, sanctions, boycotts, mandated arbitration or mediation are improper procedures to be used by public junior college faculty who are dissatisfied with their conditions of employment.					
14. A faculty member cannot withhold his services without violating professional ethics and trust.					
15. Collective negotiations is an infringement on the authority of the governing board and should be resisted.					
16. Collective negotiations is a good way to unite the teaching profession into a powerful political body.					
17. Collectively negotiated written labor agreements place undesirable restrictions on the administration.					

	SA	A	U	D	SD
18. Collective negotiations can provide a vehicle whereby faculty members gain greater on-the-job dignity and independence in performing their fuhctions.					
19. The many leaders in the drive for collective negotiations are power seekers who do not have the best interests of education at heart.					
20. The local faculty organization should seek to regulate standards for hiring of new faculty members.					
21. Faculty members have a right to impose sanctions on governing boards under certain circumstances.					
22. Sanctions are a step forward in acceptance of faculty responsibility for self-discipline and for insistence upon conditions conducive to an effective program of education.					
23. Sanctions are a means of improving educational opportunities and eliminating conditions' detrimental to professional service.					
24. Censure by means of articles in professional association journals, special study reports, newspapers, or other mass media is a legitimate technique for faculty use.					
25. The traditional position that faculty members, as public employees, may not strike is in the best interest of public higher education					
26. The services of the faculty are not so necessary to the public welfare as to necessitate the forfeiture of the right of faculty to strike.					
27. Any faculty sanction or other coercive measure is completely unprofessional.					
28. It is unwise to establish educational policies and practices through collective negotiations.					
29. When the governing board denies the requests of the faculty, the faculty has a right to present the facts to the public and to their professional associates employed in other colleges.					
30. Collective negotiations can bring greater order and system to education.					

III.

1. List below in rank order (most important first through least important last) 4-6 factors which make biology teaching successful by an instructor.

____

____

____

____

____

____

2. If any of the above are adversely affected by collective bargaining list them in rank order (most affected first through least affected last).

____

____

____

____

____

______________________________ You may list "none are affected"

3. The following is a list of factors or influences which might adversely influence your classroom performance. Rank them in order of most important to least important as they affect your classroom performance today (assign a number 1 to the most important, a number 2 to the next most important, number 11 to the least important). Please assign a number to each.

_____ Collective bargaining.
_____ Excessive absence.
_____ Personal illness.
_____ Asian wars.
_____ National politics.
_____ Poor instructor.
_____ Family illness.
_____ Dollar crisis.
_____ An emotional problem.
_____ Bargaining impasse.
_____ Administrative harrassment.

IV.

On the following pages there is either a word or an expression in capitalized letters followed by pairs of opposite words underneath the capitalized word or expression. Most pertain to the teaching of attitudes in biology, several to bargaining. Between each of the pairs of opposites there are seven dashes. You are to place a check mark on one of the 7 positions that are between the two opposite words. The check mark should indicate how you feel about the word or concept. Look at the example below:

Example: EDUCATION

good _X_:___:___:___:___:___:___ bad
slow ___:_X_:___:___:___:___:___ fast
cruel ___:___:___:___:___:_X_:___ kind

On the following place your check marks rapidly. What is wanted is your first impression. There are no "right" or "wrong" answers. Be sure to make only one check for each pair of words. Do not skip any words.

---

1. FOSTERING OF OPENMINDEDNESS

large ___:___:___:___:___:___:___ small
good ___:___:___:___:___:___:___ bad
passive ___:___:___:___:___:___:___ active
weak ___:___:___:___:___:___:___ strong
fast ___:___:___:___:___:___:___ slow
worthless ___:___:___:___:___:___:___ valuable
nice ___:___:___:___:___:___:___ awful
unfair ___:___:___:___:___:___:___ fair

2. VALUING LOGICAL REASONING

fair ___:___:___:___:___:___:___ unfair
valuable ___:___:___:___:___:___:___ worthless
active ___:___:___:___:___:___:___ passive
nice ___:___:___:___:___:___:___ awful
strong ___:___:___:___:___:___:___ weak
small ___:___:___:___:___:___:___ large
slow ___:___:___:___:___:___:___ fast
good ___:___:___:___:___:___:___ bad

3. REJECTION OF MYTH AND SUPERSTITION

large ___:___:___:___:___:___:___ small
good ___:___:___:___:___:___:___ bad
unfair ___:___:___:___:___:___:___ fair
weak ___:___:___:___:___:___:___ strong
active ___:___:___:___:___:___:___ passive
awful ___:___:___:___:___:___:___ nice
slow ___:___:___:___:___:___:___ fast
valuable ___:___:___:___:___:___:___ worthless

4. BARGAINING IMPASSE

strong ___:___:___:___:___:___:___ weak
fast ___:___:___:___:___:___:___ slow
awful ___:___:___:___:___:___:___ nice
valuable ___:___:___:___:___:___:___ useless
small ___:___:___:___:___:___:___ large
unfair ___:___:___:___:___:___:___ fair
good ___:___:___:___:___:___:___ bad
passive ___:___:___:___:___:___:___ active

5. SCIENTIFIC ATTITUDES

bad ___:___:___:___:___:___:___ good
large ___:___:___:___:___:___:___ small
weak ___:___:___:___:___:___:___ strong
nice ___:___:___:___:___:___:___ awful
active ___:___:___:___:___:___:___ passive
fast ___:___:___:___:___:___:___ slow
unfair ___:___:___:___:___:___:___ fair
worthless ___:___:___:___:___:___:___ valuable

6. INTERACTION OF SCIENCE AND THE ARTS

good ___:___:___:___:___:___:___ bad
active ___:___:___:___:___:___:___ passive
awful ___:___:___:___:___:___:___ nice
small ___:___:___:___:___:___:___ large
fair ___:___:___:___:___:___:___ unfair
fast ___:___:___:___:___:___:___ slow
worthless ___:___:___:___:___:___:___ valuable
weak ___:___:___:___:___:___:___ strong

7. USE OF SANCTIONS IN BARGAINING

weak ___:___:___:___:___:___:___ strong
passive ___:___:___:___:___:___:___ active
good ___:___:___:___:___:___:___ bad
fast ___:___:___:___:___:___:___ slow
nice ___:___:___:___:___:___:___ awful
useless ___:___:___:___:___:___:___ valuable
fair ___:___:___:___:___:___:___ unfair
large ___:___:___:___:___:___:___ small

8. SCIENCE

unfair ____:____:____:____:____:____:____ fair

passive ____:____:____:____:____:____:____ active

strong ____:____:____:____:____:____:____ weak

nice ____:____:____:____:____:____:____ awful

slow ____:____:____:____:____:____:____ fast

valuable ____:____:____:____:____:____:____ worthless

bad ____:____:____:____:____:____:____ good

large ____:____:____:____:____:____:____ small

9. SCIENTIFIC LITERACY

large ____:____:____:____:____:____:____ small

strong ____:____:____:____:____:____:____ weak

awful ____:____:____:____:____:____:____ nice

slow ____:____:____:____:____:____:____ fast

worthless ____:____:____:____:____:____:____ valuable

good ____:____:____:____:____:____:____ bad

passive ____:____:____:____:____:____:____ active

unfair ____:____:____:____:____:____:____ fair

10. METHODS AND PROCEDURES OF SCIENCE

active ____:____:____:____:____:____:____ passive

bad ____:____:____:____:____:____:____ good

slow ____:____:____:____:____:____:____ fast

valuable ____:____:____:____:____:____:____ worthless

strong ____:____:____:____:____:____:____ weak

small ____:____:____:____:____:____:____ large

nice ____:____:____:____:____:____:____ awful

fair ____:____:____:____:____:____:____ unfair

11. APPRECIATION OF THE LIMITATIONS OF SCIENCE

weak ____:____:____:____:____:____:____ strong

fair ____:____:____:____:____:____:____ unfair

small ____:____:____:____:____:____:____ large

active ____:____:____:____:____:____:____ passive

worthless ____:____:____:____:____:____:____ valuable

awful ____:____:____:____:____:____:____ nice

bad ____:____:____:____:____:____:____ good

fast ____:____:____:____:____:____:____ slow

12. SCIENCE AS A BASIC PART OF MODERN LIVING

weak ____:____:____:____:____:____:____ strong
awful ____:____:____:____:____:____:____ nice
fast ____:____:____:____:____:____:____ slow
large ____:____:____:____:____:____:____ small
valuable ____:____:____:____:____:____:____ worthless
good ____:____:____:____:____:____:____ bad
fair ____:____:____:____:____:____:____ unfair

13. USE OF STRIKES BY TEACHERS

large ____:____:____:____:____:____:____ small
good ____:____:____:____:____:____:____ bad
passive ____:____:____:____:____:____:____ active
weak ____:____:____:____:____:____:____ strong
fast ____:____:____:____:____:____:____ slow
worthless ____:____:____:____:____:____:____ valuable
nice ____:____:____:____:____:____:____ awful
unfair ____:____:____:____:____:____:____ fair

V.

Would you answer part II differently if you were answering in terms of how you felt 12 months ago: yes _____ no _____.

FACULTY OPINIONNAIRE

I.

1. Number of years you have taught biology __________.
2. Number of years at this college __________.
3. Sex: Male ________ Female ________.
4. Full-time instructor _________ Part-time instructor __________.
5. BA degree ______ MA degree ______ MA+30 ______ PhD ______.
6. Are you a dues paying member of your faculty organization? Yes _________ No _________.
7. Do you grade on a curve distribution? Yes ______ No ______.

II.

Please take several minutes to reflect back to Autumn, 1972. The following questions pertain to how you felt at that time in regard to several apsects of your teaching environment as a college instructor of biology. Please answer every question quickly, by utilizing the answer which best suits the question.* Answer according to how you felt about them in Autumn, 1972. Your answers will remain strictly confidential. For your benefit, an IMPASSE is a bargaining situation where neither side will agree so that progress can continue. A SANCTION is a form of coercion used by a teacher group to make the other side agree to their demands. A STRIKE is a withholding of services by a teacher group when bargaining breaks down.

*Utilize SA (strongly agree), A (agree), U (undecided), D (disagree), SD (strongly disagree) to answer each of the following:

	SA	A	U	D	SD
1. Collective bargaining is an effective way for faculty to participate in determining the conditions of their employment.					
2. Collective bargaining is an effective way for faculty to limit the unilateral authority of the governing board.					
3. Faculty members should be able to withhold their services (when satisfactory agreement between their organization and the governing board cannot be reached).					
4. Collective bargaining should if possible omit the threat of withholding services.					
5. Faculty members should be able to organize freely and to bargain collectively on their working conditions.					
6. Faculty organizations at local, state, and national levels should publicize unfair practices by a governing board through the media such as TV, radio, newspapers, and magazines.					
7. Collective bargaining is primarily a coercive technique that will have detrimental effects on higher education.					
8. Strikes on the part of faculty members are an undesirable aspect of collective negotiations.					
9. Militant faculty organizations are made up of a large number of malcontents and misfits.					
10. Faculty members should not strike in order to enforce their demands.					
11. Good faculty members can always get the salary they need without resorting to collective negotiations.					
12. Collective bargaining alias collective negotiations, is beneath the dignity of college faculty members.					

	SA	A	U	D	SD
13. Strikes, sanctions, boycotts, mandated arbitration or mediation are improper procedures to be used by public junior college faculty who are dissatisfied with their conditions of employment.					
14. A faculty member cannot withhold his services without violating professional ethics and trust.					
15. Collective bargaining is an infringement on the authority of the governing board and should be resisted.					
16. Collective bargaining is a good way to unite the teaching profession into a powerful political body.					
17. Collectively bargained written labor agreements place undesirable restrictions on the administration.					
18. Collective bargaining can provide a vehicle whereby faculty members gain greater on-the-job dignity and independence in performing their functions.					
19. The many leaders in the drive for collective bargaining are power seekers who do not have the best interests of education at heart.					
20. The local faculty organization should seek to regulate standards for hiring of new faculty members.					
21. Faculty members have a right to impose sanctions on governing boards under certain circumstances.					
221 Sanctions are a step forward in acceptance of faculty responsibility for self-discipline and for insistence upon conditions conducive to an effective program of education.					
23. Sanctions are a means of improving educational opportunities and eliminating conditions detrimental to professional service.					

	SA	A	U	D	SD
24. Censure by means of articles in professional association journals, special study reports, newspapers, or other mass media is a legitimate technique for faculty use.					
25. The traditional position that faculty members, as public employees, may not strike is in the best interest of public higher education.					
26. The services of the faculty are not so necessary to the public welfare as to necessitate the forfeiture of the right of faculty to strike.					
27. Any faculty sanction or other coercive measure is completely unprofessional.					
28. It is unwise to establish educational policies and practices through collective negotiations.					
29. When the governing board denies the requents of the faculty, the faculty has a right to present the facts to the public and to their professional associates employed in other colleges.					
30. Collective bargaining can bring greater order and system to education.					

Would you answer Part II differently if you were answering in terms of how you feel today: Yes ________ No ________

If yes: More Positively ______ Less Positively ______
No Difference ______

III.

1. The following is a list of factors which might make biology teaching successful by an instructor. Rank them in order of most important to least important (assign a number 1 to the most important, number 2 to the next most important, through number 8 to least important). Please assign a different number to each.

____Academically competent.

____Good student-teacher relationship.

____Materials adapted to student abilities.

____Well-organized lectures and laboratories.

____Adequate learning materials.

____Clear assignments and expectations.

____Interesting lectures and laboratories.

____Positive attitude about teaching biology.

2. Rank the above items as they were adversely affected by the process of collective bargaining (contract negotiations) during Fall, 1972. Rank them in order of most affected to least affected (assign a number 1 to the most affected, number 2 to the next most affected, through number 8 to the least affected). Please assign a different number to each.

____Academically competent.

____Good student-teacher relationship.

____Materials adapted to student abilities.

____Well-organized lectures and laboratories.

____Adequate learning materials.

____Clear assignments and expectations.

____Interesting lectures and laboratories.

____Positive attitude about teaching biology.

3. The following is a list of factors or influences which might have adversely influenced your classroom performance during fall semester, 1972. Rank them in order of most important to least important as they affected your classroom performance during that semester (assign a number 1 to the most important, number 2 to the next most important, through number 8, to the least important). Please assign a different number to each.

____Collective bargaining.

____Excessive absence.

____Foreign wars.

____National politics.

____Poor student group.

____Illness.

____Emotional problem.

____Bargaining impasse.

IV.

On the following pages there is either a word or an expression in capitalized letters followed by pairs of opposite words underneath the capitalized word or expression. Most pertain to the teaching of attitudes in biology, several to bargaining. Between each of the pairs of opposites there are seven dashes. You are to place a check mark on one of the 7 positions that are between the two opposite words. The check mark should indicate how you feel about the word or concept. Look at the example below:

Example: EDUCATION

good ____ : ____ : ✓ : ____ : ____ : ____ : ____ bad

slow ____ : ✓ : ____ : ____ : ____ : ____ : ____ fast

cruel ____ : ____ : ____ : ____ : ✓ : ____ : ____ kind

On the following place your check marks rapidly. What is wanted is your first impression. There are no "right" or "wrong" answers. Be sure to make only one check for each pair of words. Do not skip any words.

1.

FOSTERING OF OPENMINDEDNESS

large ____ : ____ : ____ : ____ : ____ : ____ : ____ small

good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad

passive ____ : ____ : ____ : ____ : ____ : ____ : ____ active

weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong

fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow

worthless ____ : ____ : ____ : ____ : ____ : ____ : ____ valuable

nice ____ : ____ : ____ : ____ : ____ : ____ : ____ awful

unfair ____ : ____ : ____ : ____ : ____ : ____ : ____ fair

2. VALUING LOGICAL REASONING

fair ____ : ____ : ____ : ____ : ____ : ____ : ____ unfair
valuable ____ : ____ : ____ : ____ : ____ : ____ : ____ worthless
active ____ : ____ : ____ : ____ : ____ : ____ : ____ passive
nice ____ : ____ : ____ : ____ : ____ : ____ : ____ awful
strong ____ : ____ : ____ : ____ : ____ : ____ : ____ weak
small ____ : ____ : ____ : ____ : ____ : ____ : ____ large
slow ____ : ____ : ____ : ____ : ____ : ____ : ____ fast
good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad

3. REJECTION OF MYTH AND SUPERSTITION

large ____ : ____ : ____ : ____ : ____ : ____ : ____ small
good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad
unfair ____ : ____ : ____ : ____ : ____ : ____ : ____ fair
weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong
active ____ : ____ : ____ : ____ : ____ : ____ : ____ passive
awful ____ : ____ : ____ : ____ : ____ : ____ : ____ nice
slow ____ : ____ : ____ : ____ : ____ : ____ : ____ fast
valuable ____ : ____ : ____ : ____ : ____ : ____ : ____ worthless

4. BARGAINING IMPASSE

strong ____ : ____ : ____ : ____ : ____ : ____ : ____ weak
fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow
awful ____ : ____ : ____ : ____ : ____ : ____ : ____ nice
valuable ____ : ____ : ____ : ____ : ____ : ____ : ____ worthless
small ____ : ____ : ____ : ____ : ____ : ____ : ____ large

unfair ____ : ____ : ____ : ____ : ____ : ____ : ____ fair

good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad

passive ____ : ____ : ____ : ____ : ____ : ____ : ____ active

5. SCIENTIFIC ATTITUDES

bad ____ : ____ : ____ : ____ : ____ : ____ : ____ good

large ____ : ____ : ____ : ____ : ____ : ____ : ____ small

weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong

nice ____ : ____ : ____ : ____ : ____ : ____ : ____ awful

active ____ : ____ : ____ : ____ : ____ : ____ : ____ passive

fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow

unfair ____ : ____ : ____ : ____ : ____ : ____ : ____ fair

worthless ____ : ____ : ____ : ____ : ____ : ____ : ____ valuable

6. INTERACTION OF SCIENCE AND THE ARTS

good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad

active ____ : ____ : ____ : ____ : ____ : ____ : ____ passive

awful ____ : ____ : ____ : ____ : ____ : ____ : ____ nice

small ____ : ____ : ____ : ____ : ____ : ____ : ____ large

fair ____ : ____ : ____ : ____ : ____ : ____ : ____ unfair

fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow

worthless ____ : ____ : ____ : ____ : ____ : ____ : ____ valuable

weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong

7.

USE OF SANCTIONS IN BARGAINING

weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong

passive ____ : ____ : ____ : ____ : ____ : ____ : ____ active

good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad

fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow

nice ____ : ____ : ____ : ____ : ____ : ____ : ____ awful

worthless ____ : ____ : ____ : ____ : ____ : ____ : ____ valuable

fair ____ : ____ : ____ : ____ : ____ : ____ : ____ unfair

large ____ : ____ : ____ : ____ : ____ : ____ : ____ small

8.

SCIENCE

unfair ____ : ____ : ____ : ____ : ____ : ____ : ____ fair

passive ____ : ____ : ____ : ____ : ____ : ____ : ____ active

strong ____ : ____ : ____ : ____ : ____ : ____ : ____ weak

nice ____ : ____ : ____ : ____ : ____ : ____ : ____ awful

slow ____ : ____ : ____ : ____ : ____ : ____ : ____ fast

valuable ____ : ____ : ____ : ____ : ____ : ____ : ____ worthless

bad ____ : ____ : ____ : ____ : ____ : ____ : ____ good

large ____ : ____ : ____ : ____ : ____ : ____ : ____ small

9.

SCIENTIFIC LITERACY

large ____ : ____ : ____ : ____ : ____ : ____ : ____ small

strong ____ : ____ : ____ : ____ : ____ : ____ : ____ weak

awful ____ : ____ : ____ : ____ : ____ : ____ : ____ nice

slow ____ : ____ : ____ : ____ : ____ : ____ : ____ fast

worthless ____ : ____ : ____ : ____ : ____ : ____ : ____ valuable

good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad

passive ____ : ____ : ____ : ____ : ____ : ____ : ____ active

unfair ____ : ____ : ____ : ____ : ____ : ____ : ____ fair

10. METHODS AND PROCEDURES OF SCIENCE

active ____ : ____ : ____ : ____ : ____ : ____ : ____ passive

bad ____ : ____ : ____ : ____ : ____ : ____ : ____ good

slow ____ : ____ : ____ : ____ : ____ : ____ : ____ fast

valuable ____ : ____ : ____ : ____ : ____ : ____ : ____ worthless

strong ____ : ____ : ____ : ____ : ____ : ____ : ____ weak

small ____ : ____ : ____ : ____ : ____ : ____ : ____ large

nice ____ : ____ : ____ : ____ : ____ : ____ : ____ awful

fair ____ : ____ : ____ : ____ : ____ : ____ : ____ unfair

11. APPRECIATION OF THE LIMITATIONS OF SCIENCE

weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong

fair ____ : ____ : ____ : ____ : ____ : ____ : ____ unfair

small ____ : ____ : ____ : ____ : ____ : ____ : ____ large

active ____ : ____ : ____ : ____ : ____ : ____ : ____ passive

worthless ____ : ____ : ____ : ____ : ____ : ____ : ____ valuable

awful ____ : ____ : ____ : ____ : ____ : ____ : ____ nice

bad ____ : ____ : ____ : ____ : ____ : ____ : ____ good

fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow

12 SCIENCE AS A BASIC PART OF MODERN LIVING

passive ____ : ____ : ____ : ____ : ____ : ____ : ____ active

weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong

awful ____ : ____ : ____ : ____ : ____ : ____ : ____ nice

fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow

large ____ : ____ : ____ : ____ : ____ : ____ : ____ small

valuable ____ : ____ : ____ : ____ : ____ : ____ : ____ worthless

good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad

fair ____ : ____ : ____ : ____ : ____ : ____ : ____ unfair

13. USE OF STRIKES BY TEACHERS

large ____ : ____ : ____ : ____ : ____ : ____ : ____ small

good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad

passive ____ : ____ : ____ : ____ : ____ : ____ : ____ active

weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong

fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow

worthless ____ : ____ : ____ : ____ : ____ : ____ : ____ valuable

nice ____ : ____ : ____ : ____ : ____ : ____ : ____ awful

unfair ____ : ____ : ____ : ____ : ____ : ____ : ____ fair

STUDENT OPINIONNAIRE

TIME PERSPECTIVE OF AUTUMN, 1972

I.

1. Number of years since high school graduation (as of last September, 1972) __________.
2. Were you then draft eligible __________.
3. Male __________ or female __________.
4. Were you a full-time __________ or part-time __________ student.
5. Veteran __________ or non-veteran __________.
6. Did you plan to continue your education beyond the community college: yes __________ no __________.
7. Did you plan to transfer to a four-year school: yes_____ no _____.
8. Did you plan to major in science: yes ______ no _______.
9. How did you rate as a student: A ____ B ____ C ____ D ____ E ____.
10. How did you rate as a science student: A ____ B ____ C ____ D ____ E ____.

II.

Please take several minutes to reflect back to Autumn, 1972. The following questions pertain to how you felt at that time in regard to several aspects of your learning environment as a college student in general biology. Please answer every question quickly, by utilizing the answer which best suits the question.* Answer according to how you felt about them in Autumn, 1972. Your answers will remain strictly confidential. For your benefit, an IMPASSE is a bargaining situation where neither side will agree so that progress can continue. A SANCTION is a form of coercion used by a teacher group to make the other side agree to their demands. A STRIKE is a withholding of services by a teacher group when bargaining breaks down.

*Utilize SA (strongly agree), A (agree), U (undecided), D (disagree), SD (strongly disagree) to answer each of the following:

	SA	A	U	D	SD
1. Collective bargaining is an effective way for faculty to participate in determining the conditions of their employment.					
2. Collective bargaining is an effective way for faculty to limit the unilateral authority of the governing board.					
3. Faculty members should be able to withhold their services (when satisfactory agreement between their organization and the governing board cannot be reached).					
4. Collective bargaining should if possible omit the threat of withholding services.					
5. Faculty members should be able to organize freely and to bargain collectively on their working conditions.					
6. Faculty organizations at local, state, and national levels should publicize unfair practices by a governing board through the media such as TV, radio, newspapers, and magazines.					
7. Collective bargaining is primarily a coercive technique that will have detrimental effects on higher education.					
8. Strikes on the part of faculty members are an undesirable aspect of collective negotiations.					
9. Militant faculty organizations are made up of a large number of malcontents and misfits.					
10. Faculty members should not strike in order to enforce their demands.					
11. Good faculty members can always get the salary they need without resorting to collective negotiations.					
12. Collective bargaining alias collective negotiations, is beneath the dignity of college faculty members.					

		SA	A	U	D	SD
13.	Strikes, sanctions, boycotts, mandated arbitration or mediation are improper procedures to be used by public junior college faculty who are dissatisfied with their conditions of employment.					
14.	A faculty member cannot withhold his services without violating professional ethics and trust.					
15.	Collective bargaining is an infringement on the authority of the governing board and should be resisted.					
16.	Collective bargaining is a good way to unite the teaching profession into a powerful political body.					
17.	Collectively bargained written labor agreements place undesirable restrictions on the administration.					
18.	Collective bargaining can provide a vehicle whereby faculty members gain greater on-the-job dignity and independence in performing their functions.					
19.	The many leaders in the drive for collective bargaining are power seekers who do not have the best interests of education at heart.					
20.	The local faculty organization should seek to regulate standards for hiring of new faculty members.					
21.	Faculty members have a right to impose sanctions on governing boards under certain circumstances.					
221	Sanctions are a step forward in acceptance of faculty responsibility for self-discipline and for insistence upon conditions conducive to an effective program of education.					
23.	Sanctions are a means of improving educational opportunities and eliminating conditions detrimental to professional service.					

	SA	A	U	D	SD
24. Censure by means of articles in professional association journals, special study reports, newspapers, or other mass media is a legitimate technique for faculty use.					
25. The traditional position that faculty members, as public employees, may not strike is in the best interest of public higher education.					
26. The services of the faculty are not so necessary to the public welfare as to necessitate the forfeiture of the right of faculty to strike.					
27. Any faculty sanction or other coercive measure is completely unprofessional.					
28. It is unwise to establish educational policies and practices through collective negotiations.					
29. When the governing board denies the requents of the faculty, the faculty has a right to present the facts to the public and to their professional associates employed in other colleges.					
30. Collective bargaining can bring greater order and system to education.					

Would you answer Part II differently if you were answering in terms of how you feel today: Yes ________ No ________

If yes: More Positively ______ Less Positively ______
No Difference ______

III.

1. The following is a list of factors which might make biology teaching successful by an instructor. Rank them in order of most important to least important (assign a number 1 to the most important, number 2 to the next most important, through number 8 to least important). Please assign a different number to each.

____Academically competent.

____Good student-teacher relationship.

____Materials adapted to student abilities.

____Well-organized lectures and laboratories.

____Adequate learning materials.

____Clear assignments and expectations.

____Interesting lectures and laboratories.

____Positive attitude about teaching biology.

2. Rank the above items as they were adversely affected by the process of collective bargaining (contract negotiations) during Fall, 1972. Rank them in order of most affected to least affected (assign a number 1 to the most affected, number 2 to the next most affected, through number 8 to the least affected). Please assign a different number to each.

____Academically competent.

____Good student-teacher relationship.

____Materials adapted to student abilities.

____Well-organized lectures and laboratories.

____Adequate learning materials.

____Clear assignments and expectations.

____Interesting lectures and laboratories.

____Positive attitude about teaching biology.

3. The following is a list of factors or influences which might have adversely influenced your classroom performance during fall semester, 1972. Rank them in order of most important to least important as they affected your classroom performance during that semester (assign a number 1 to the most important, number 2 to the next most important, through number 8, to the least important). Please assign a different number to each.

____Collective bargaining.

____Excessive absence.

____Foreign wars.

____National politics.

____Poor instruction.

____Illness.

____Emotional problem.

____Bargaining impasse.

IV.

On the following pages there is either a word or an expression in capitalized letters followed by pairs of opposite words underneath the capitalized word or expression. Most pertain to the teaching of attitudes in biology, several to bargaining. Between each of the pairs of opposites there are seven dashes. You are to place a check mark on one of the 7 positions that are between the two opposite words. The check mark should indicate how you feel about the word or concept. Look at the example below:

Example: EDUCATION

good ____ : ____ : ✓ : ____ : ____ : ____ : ____ bad
slow ____ : ✓ : ____ : ____ : ____ : ____ : ____ fast
cruel ____ : ____ : ____ : ____ : ✓ : ____ : ____ kind

On the following place your check marks rapidly. What is wanted is your first impression. There are no "right" or "wrong" answers. Be sure to make only one check for each pair of words. Do not skip any words.

1.

FOSTERING OF OPENMINDEDNESS

large ____ : ____ : ____ : ____ : ____ : ____ : ____ small
good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad
passive ____ : ____ : ____ : ____ : ____ : ____ : ____ active
weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong
fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow
worthless ____ : ____ : ____ : ____ : ____ : ____ : ____ valuable
nice ____ : ____ : ____ : ____ : ____ : ____ : ____ awful
unfair ____ : ____ : ____ : ____ : ____ : ____ : ____ fair

2. VALUING LOGICAL REASONING

fair ____ : ____ : ____ : ____ : ____ : ____ : ____ unfair
valuable ____ : ____ : ____ : ____ : ____ : ____ : ____ worthless
active ____ : ____ : ____ : ____ : ____ : ____ : ____ passive
nice ____ : ____ : ____ : ____ : ____ : ____ : ____ awful
strong ____ : ____ : ____ : ____ : ____ : ____ : ____ weak
small ____ : ____ : ____ : ____ : ____ : ____ : ____ large
slow ____ : ____ : ____ : ____ : ____ : ____ : ____ fast
good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad

3. REJECTION OF MYTH AND SUPERSTITION

large ____ : ____ : ____ : ____ : ____ : ____ : ____ small
good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad
unfair ____ : ____ : ____ : ____ : ____ : ____ : ____ fair
weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong
active ____ : ____ : ____ : ____ : ____ : ____ : ____ passive
awful ____ : ____ : ____ : ____ : ____ : ____ : ____ nice
slow ____ : ____ : ____ : ____ : ____ : ____ : ____ fast
valuable ____ : ____ : ____ : ____ : ____ : ____ : ____ worthless

4. BARGAINING IMPASSE

strong ____ : ____ : ____ : ____ : ____ : ____ : ____ weak
fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow
awful ____ : ____ : ____ : ____ : ____ : ____ : ____ nice
valuable ____ : ____ : ____ : ____ : ____ : ____ : ____ worthless
small ____ : ____ : ____ : ____ : ____ : ____ : ____ large

unfair ____ : ____ : ____ : ____ : ____ : ____ : ____ fair
good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad
passive ____ : ____ : ____ : ____ : ____ : ____ : ____ active

5. SCIENTIFIC ATTITUDES

bad ____ : ____ : ____ : ____ : ____ : ____ : ____ good
large ____ : ____ : ____ : ____ : ____ : ____ : ____ small
weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong
nice ____ : ____ : ____ : ____ : ____ : ____ : ____ awful
active ____ : ____ : ____ : ____ : ____ : ____ : ____ passive
fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow
unfair ____ : ____ : ____ : ____ : ____ : ____ : ____ fair
worthless ____ : ____ : ____ : ____ : ____ : ____ : ____ valuable

6. INTERACTION OF SCIENCE AND THE ARTS

good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad
active ____ : ____ : ____ : ____ : ____ : ____ : ____ passive
awful ____ : ____ : ____ : ____ : ____ : ____ : ____ nice
small ____ : ____ : ____ : ____ : ____ : ____ : ____ large
fair ____ : ____ : ____ : ____ : ____ : ____ : ____ unfair
fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow
worthless ____ : ____ : ____ : ____ : ____ : ____ : ____ valuable
weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong

7.

USE OF SANCTIONS IN BARGAINING

weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong
passive ____ : ____ : ____ : ____ : ____ : ____ : ____ active
good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad
fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow
nice ____ : ____ : ____ : ____ : ____ : ____ : ____ awful
worthless ____ : ____ : ____ : ____ : ____ : ____ : ____ valuable
fair ____ : ____ : ____ : ____ : ____ : ____ : ____ unfair
large ____ : ____ : ____ : ____ : ____ : ____ : ____ small

8.

SCIENCE

unfair ____ : ____ : ____ : ____ : ____ : ____ : ____ fair
passive ____ : ____ : ____ : ____ : ____ : ____ : ____ active
strong ____ : ____ : ____ : ____ : ____ : ____ : ____ weak
nice ____ : ____ : ____ : ____ : ____ : ____ : ____ awful
slow ____ : ____ : ____ : ____ : ____ : ____ : ____ fast
valuable ____ : ____ : ____ : ____ : ____ : ____ : ____ worthless
bad ____ : ____ : ____ : ____ : ____ : ____ : ____ good
large ____ : ____ : ____ : ____ : ____ : ____ : ____ small

9.

SCIENTIFIC LITERACY

large ____ : ____ : ____ : ____ : ____ : ____ : ____ small
strong ____ : ____ : ____ : ____ : ____ : ____ : ____ weak
awful ____ : ____ : ____ : ____ : ____ : ____ : ____ nice
slow ____ : ____ : ____ : ____ : ____ : ____ : ____ fast
worthless ____ : ____ : ____ : ____ : ____ : ____ : ____ valuable
good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad

passive ____ : ____ : ____ : ____ : ____ : ____ : ____ active

unfair ____ : ____ : ____ : ____ : ____ : ____ : ____ fair

10.

METHODS AND PROCEDURES OF SCIENCE

active ____ : ____ : ____ : ____ : ____ : ____ : ____ passive

bad ____ : ____ : ____ : ____ : ____ : ____ : ____ good

slow ____ : ____ : ____ : ____ : ____ : ____ : ____ fast

valuable ____ : ____ : ____ : ____ : ____ : ____ : ____ worthless

strong ____ : ____ : ____ : ____ : ____ : ____ : ____ weak

small ____ : ____ : ____ : ____ : ____ : ____ : ____ large

nice ____ : ____ : ____ : ____ : ____ : ____ : ____ awful

fair ____ : ____ : ____ : ____ : ____ : ____ : ____ unfair

11.

APPRECIATION OF THE LIMITATIONS OF SCIENCE

weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong

fair ____ : ____ : ____ : ____ : ____ : ____ : ____ unfair

small ____ : ____ : ____ : ____ : ____ : ____ : ____ large

active ____ : ____ : ____ : ____ : ____ : ____ : ____ passive

worthless ____ : ____ : ____ : ____ : ____ : ____ : ____ valuable

awful ____ : ____ : ____ : ____ : ____ : ____ : ____ nice

bad ____ : ____ : ____ : ____ : ____ : ____ : ____ good

fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow

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SCIENCE AS A BASIC PART OF MODERN LIVING

passive ____ : ____ : ____ : ____ : ____ : ____ : ____ active

weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong

awful ____ : ____ : ____ : ____ : ____ : ____ : ____ nice

fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow
large ____ : ____ : ____ : ____ : ____ : ____ : ____ small
valuable ____ : ____ : ____ : ____ : ____ : ____ : ____ worthless
good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad
fair ____ : ____ : ____ : ____ : ____ : ____ : ____ unfair

13. USE OF STRIKES BY TEACHERS

large ____ : ____ : ____ : ____ : ____ : ____ : ____ small
good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad
passive ____ : ____ : ____ : ____ : ____ : ____ : ____ active
weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong
fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow
worthless ____ : ____ : ____ : ____ : ____ : ____ : ____ valuable
nice ____ : ____ : ____ : ____ : ____ : ____ : ____ awful
unfair ____ : ____ : ____ : ____ : ____ : ____ . ____ fair

STUDENT OPINIONNAIRE

TIME PERSPECTIVE OF AUTUMN, 1973

I.

1. Number of years since high school graduation (as of last September, 1972) __________.
2. Were you then draft eligible __________.
3. Male __________ or female __________.
4. Were you a full-time __________ or part-time __________ student.
5. Veteran __________ or non-veteran __________.
6. Did you plan to continue your education beyond the community college: yes __________ no __________.
7. Did you plan to transfer to a four-year school: yes____ no _____.
8. Did you plan to major in science: yes ______ no _______.
9. How did you rate as a student: A ____ B ____ C ____ D ____ E ____.
10. How did you rate as a science student: A ____ B ____ C ____ D ____ E ____.

II.

Please take several minutes to reflect upon how you feel about collective bargaining. These questions pertain to how you feel now in regard to several aspects of your learning environment as a college student. Please answer every question quickly, by utilizing the answer which best suits the question.* Your answers will remain strictly confidential. Underline any words which you do not understand, or you feel are ambiguous or confusing to you. For your benefit, an IMPASSE is a bargaining situation where neither side will agree so that progress can continue. A SANCTION is a form of coercion used by a teacher group to make the other side agree to their demands. A STRIKE is a withholding of services by a teacher group when bargaining breaks down.

*Utilize SA (strongly agree), A (agree), U (undecided), D (disagree), SD (strongly disagree) to answer each of the following:

	SA	A	U	D	SD
1. Collective bargaining is an effective way for faculty to participate in determining the conditions of their employment.					
2. Collective bargaining is an effective way for faculty to limit the unilateral authority of the governing board.					
3. Faculty members should be able to withhold their services (when satisfactory agreement between their organization and the governing board cannot be reached).					
4. Collective bargaining should if possible omit the threat of withholding services.					
5. Faculty members should be able to organize freely and to bargain collectively on their working conditions.					
6. Faculty organizations at local, state, and national levels should publicize unfair practices by a governing board through the media such as TV, radio, newspapers, and magazines.					
7. Collective bargaining is primarily a coercive technique that will have detrimental effects on higher education.					
8. Strikes on the part of faculty members are an undesirable aspect of collective negotiations.					
9. Militant faculty organizations are made up of a large number of malcontents and misfits.					
10. Faculty members should not strike in order to enforce their demands.					
11. Good faculty members can always get the salary they need without resorting to collective negotiations.					
12. Collective bargaining alias collective negotiations, is beneath the dignity of college faculty members.					

		SA	A	U	D	SD
13.	Strikes, sanctions, boycotts, mandated arbitration or mediation are improper procedures to be used by public junior college faculty who are dissatisfied with their conditions of employment.					
14.	A faculty member cannot withhold his services without violating professional ethics and trust.					
15.	Collective bargaining is an infringement on the authority of the governing board and should be resisted.					
16.	Collective bargaining is a good way to unite the teaching profession into a powerful political body.					
17.	Collectively bargained written labor agreements place undesirable restrictions on the administration.					
18.	Collective bargaining can provide a vehicle whereby faculty members gain greater on-the-job dignity and independence in performing their functions.					
19.	The many leaders in the drive for collective bargaining are power seekers who do not have the best interests of education at heart.					
20.	The local faculty organization should seek to regulate standards for hiring of new faculty members.					
21.	Faculty members have a right to impose sanctions on governing boards under certain circumstances.					
221	Sanctions are a step forward in acceptance of faculty responsibility for self-discipline and for insistence upon conditions conducive to an effective program of education.					
23.	Sanctions are a means of improving educational opportunities and eliminating conditions detrimental to professional service.					

	SA	A	U	D	SD
24. Censure by means of articles in professional association journals, special study reports, newspapers, or other mass media is a legitimate technique for faculty use.					
25. The traditional position that faculty members, as public employees, may not strike is in the best interest of public higher education.					
26. The services of the faculty are not so necessary to the public welfare as to necessitate the forfeiture of the right of faculty to strike.					
27. Any faculty sanction or other coercive measure is completely unprofessional.					
28. It is unwise to establish educational policies and practices through collective negotiations.					
29. When the governing board denies the requents of the faculty, the faculty has a right to present the facts to the public and to their professional associates employed in other colleges.					
30. Collective bargaining can bring greater order and system to education.					

Would you answer Part II differently if you were answering in terms of how you felt 12 months ago: Yes ________ No ________

If yes: More Positively ________ Less Positively ________
No Difference ________

III.

1. The following is a list of factors which might make biology teaching successful by an instructor. Rank them in order of most important to least important (assign a number 1 to the most important, number 2 to the next most important, through number 8 to least important). Please assign a different number to each.

____Academically competent.

____Good student-teacher relationship.

____Materials adapted to student abilities.

____Well-organized lectures and laboratories.

____Adequate learning materials.

____Clear assignments and expectations.

____Interesting lectures and laboratories.

____Positive attitude about teaching biology.

2. Rank the above items as they are adversely affected by the process of collective bargaining (contract negotiations). Rank them in order of most affected to least affected (assign a number 1 to the most affected, number 2 to next most affected, through number 8 to least affected). Please assign a different number to each.

____Academically competent.

____Good student-teacher relationship.

____Materials adapted to student abilities.

____Well-organized lectures and laboratories.

____Adequate learning materials.

____Clear assignments and expectations.

____Interesting lectures and laboratories.

____Positive attitude about teaching biology.

3. The following is a list of factors which might influence your classroom performance today. Rank them in order of most important to least important as they affect your classroom performance (assign a number 1 to the most important, number 2 to the next most important, through number 8 to the least important). Please assign a different number to each.

____Collective bargaining.

____Excessive absence.

____Foreign wars

____National politics.

____Poor instruction.

____Illness.

____Emotional problem.

____Bargaining impasse.

IV.

On the following pages there is either a word or an expression in capitalized letters followed by pairs of opposite words underneath the capitalized word or expression. Most pertain to the teaching of attitudes in biology, several to bargaining. Between each of the pairs of opposites there are seven dashes. You are to place a check mark on one of the 7 positions that are between the two opposite words. The check mark should indicate how you feel about the word or concept. Look at the example below:

Example: EDUCATION

good ____ : ____ : __✓__ : ____ : ____ : ____ : ____ bad

slow ____ : __✓__ : ____ : ____ : ____ : ____ : ____ fast

cruel ____ : ____ : ____ : ____ : __✓__ : ____ : ____ kind

On the following place your check marks rapidly. What is wanted is your first impression. There are no "right" or "wrong" answers. Be sure to make only one check for each pair of words. Do not skip any words.

1\.

FOSTERING OF OPENMINDEDNESS

large ____ : ____ : ____ : ____ : ____ : ____ : ____ small

good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad

passive ____ : ____ : ____ : ____ : ____ : ____ : ____ active

weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong

fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow

worthless ____ : ____ : ____ : ____ : ____ : ____ : ____ valuable

nice ____ : ____ : ____ : ____ : ____ : ____ : ____ awful

unfair ____ : ____ : ____ : ____ : ____ : ____ : ____ fair

2. VALUING LOGICAL REASONING

fair ___ : ___ : ___ : ___ : ___ : ___ : ___ unfair

valuable ___ : ___ : ___ : ___ : ___ : ___ : ___ worthless

active ___ : ___ : ___ : ___ : ___ : ___ : ___ passive

nice ___ : ___ : ___ : ___ : ___ : ___ : ___ awful

strong ___ : ___ : ___ : ___ : ___ : ___ : ___ weak

small ___ : ___ : ___ : ___ : ___ : ___ : ___ large

slow ___ : ___ : ___ : ___ : ___ : ___ : ___ fast

good ___ : ___ : ___ : ___ : ___ : ___ : ___ bad

3. REJECTION OF MYTH AND SUPERSTITION

large ___ : ___ : ___ : ___ : ___ : ___ : ___ small

good ___ : ___ : ___ : ___ : ___ : ___ : ___ bad

unfair ___ : ___ : ___ : ___ : ___ : ___ : ___ fair

weak ___ : ___ : ___ : ___ : ___ : ___ : ___ strong

active ___ : ___ : ___ : ___ : ___ : ___ : ___ passive

awful ___ : ___ : ___ : ___ : ___ : ___ : ___ nice

slow ___ : ___ : ___ : ___ : ___ : ___ : ___ fast

valuable ___ : ___ : ___ : ___ : ___ : ___ : ___ worthless

4. BARGAINING IMPASSE

strong ___ : ___ : ___ : ___ : ___ : ___ : ___ weak

fast ___ : ___ : ___ : ___ : ___ : ___ : ___ slow

awful ___ : ___ : ___ : ___ : ___ : ___ : ___ nice

valuable ___ : ___ : ___ : ___ : ___ : ___ : ___ worthless

small ___ : ___ : ___ : ___ : ___ : ___ : ___ large

unfair ____ : ____ : ____ : ____ : ____ : ____ : ____ fair

good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad

passive ____ : ____ : ____ : ____ : ____ : ____ : ____ active

5.

SCIENTIFIC ATTITUDES

bad ____ : ____ : ____ : ____ : ____ : ____ : ____ good

large ____ : ____ : ____ : ____ : ____ : ____ : ____ small

weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong

nice ____ : ____ : ____ : ____ : ____ : ____ : ____ awful

active ____ : ____ : ____ : ____ : ____ : ____ : ____ passive

fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow

unfair ____ : ____ : ____ : ____ : ____ : ____ : ____ fair

worthless ____ : ____ : ____ : ____ : ____ : ____ : ____ valuable

6.

INTERACTION OF SCIENCE AND THE ARTS

good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad

active ____ : ____ : ____ : ____ : ____ : ____ : ____ passive

awful ____ : ____ : ____ : ____ : ____ : ____ : ____ nice

small ____ : ____ : ____ : ____ : ____ : ____ : ____ large

fair ____ : ____ : ____ : ____ : ____ : ____ : ____ unfair

fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow

worthless ____ : ____ : ____ : ____ : ____ : ____ : ____ valuable

weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong

7.

USE OF SANCTIONS IN BARGAINING

weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong
passive ____ : ____ : ____ : ____ : ____ : ____ : ____ active
good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad
fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow
nice ____ : ____ : ____ : ____ : ____ : ____ : ____ awful
worthless ____ : ____ : ____ : ____ : ____ : ____ : ____ valuable
fair ____ : ____ : ____ : ____ : ____ : ____ : ____ unfair
large ____ : ____ : ____ : ____ : ____ : ____ : ____ small

8.

SCIENCE

unfair ____ : ____ : ____ : ____ : ____ : ____ : ____ fair
passive ____ : ____ : ____ : ____ : ____ : ____ : ____ active
strong ____ : ____ : ____ : ____ : ____ : ____ : ____ weak
nice ____ : ____ : ____ : ____ : ____ : ____ : ____ awful
slow ____ : ____ : ____ : ____ : ____ : ____ : ____ fast
valuable ____ : ____ : ____ : ____ : ____ : ____ : ____ worthless
bad ____ : ____ : ____ : ____ : ____ : ____ : ____ good
large ____ : ____ : ____ : ____ : ____ : ____ : ____ small

9.

SCIENTIFIC LITERACY

large ____ : ____ : ____ : ____ : ____ : ____ : ____ small
strong ____ : ____ : ____ : ____ : ____ : ____ : ____ weak
awful ____ : ____ : ____ : ____ : ____ : ____ : ____ nice
slow ____ : ____ : ____ : ____ : ____ : ____ : ____ fast
worthless ____ : ____ : ____ : ____ : ____ : ____ : ____ valuable
good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad

passive ____ : ____ : ____ : ____ : ____ : ____ : ____ active

unfair ____ : ____ : ____ : ____ : ____ : ____ : ____ fair

10. METHODS AND PROCEDURES OF SCIENCE

active ____ : ____ : ____ : ____ : ____ : ____ : ____ passive

bad ____ : ____ : ____ : ____ : ____ : ____ : ____ good

slow ____ : ____ : ____ : ____ : ____ : ____ : ____ fast

valuable ____ : ____ : ____ : ____ : ____ : ____ : ____ worthless

strong ____ : ____ : ____ : ____ : ____ : ____ : ____ weak

small ____ : ____ : ____ : ____ : ____ : ____ : ____ large

nice ____ : ____ : ____ : ____ : ____ : ____ : ____ awful

fair ____ : ____ : ____ : ____ : ____ : ____ : ____ unfair

11. APPRECIATION OF THE LIMITATIONS OF SCIENCE

weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong

fair ____ : ____ : ____ : ____ : ____ : ____ : ____ unfair

small ____ : ____ : ____ : ____ : ____ : ____ : ____ large

active ____ : ____ : ____ : ____ : ____ : ____ : ____ passive

worthless ____ : ____ : ____ : ____ : ____ : ____ : ____ valuable

awful ____ : ____ : ____ : ____ : ____ : ____ : ____ nice

bad ____ : ____ : ____ : ____ : ____ : ____ : ____ good

fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow

12 SCIENCE AS A BASIC PART OF MODERN LIVING

passive ____ : ____ : ____ : ____ : ____ : ____ : ____ active

weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong

awful ____ : ____ : ____ : ____ : ____ : ____ : ____ nice

fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow

large ____ : ____ : ____ : ____ : ____ : ____ : ____ small

valuable ____ : ____ : ____ : ____ : ____ : ____ : ____ worthless

good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad

fair ____ : ____ : ____ : ____ : ____ : ____ : ____ unfair

13. USE OF STRIKES BY TEACHERS

large ____ : ____ : ____ : ____ : ____ : ____ : ____ small

good ____ : ____ : ____ : ____ : ____ : ____ : ____ bad

passive ____ : ____ : ____ : ____ : ____ : ____ : ____ active

weak ____ : ____ : ____ : ____ : ____ : ____ : ____ strong

fast ____ : ____ : ____ : ____ : ____ : ____ : ____ slow

worthless ____ : ____ : ____ : ____ : ____ : ____ : ____ valuable

nice ____ : ____ : ____ : ____ : ____ : ____ : ____ awful

unfair ____ : ____ : ____ : ____ : ____ : ____ : ____ fair

APPENDIX B

CORRESPONDENCE

MACOMB COUNTY
COMMUNITY COLLEGE

SOUTH CAMPUS
14500 TWELVE MILE ROAD
WARREN, MICHIGAN 48093
779-7209

July 24, 1973

Mr. Edwin Arnfield
63261 Wolcott Road
Romeo, MI 48065

Dear Mr. Arnfield:

Dean Wagner and I appreciated the time you arranged to give us a brief progress report on your plans for doctoral research. When you are ready to compile data, the institutional records which we described to you can be made available here at the College should you wish to use them. Let us know if they will be of help to you.

Good luck on your program.

Sincerely,

Jeanne D. Trubey

Jeanne D. Trubey, Ph.D.
Dean, General Education

JT/sf

OCC

OFFICE OF THE PRESIDENT

OAKLAND COMMUNITY COLLEGE/GEORGE A. BEE ADMINISTRATIVE CENTER 2480 OPDYKE ROAD BLOOMFIELD HILLS, MICHIGAN 48013/PHONE 647 6200

August 8, 1973

Mr. Edwin A. Arnfield, Professor
Department of Mathematics and Science
South Campus
Macomb County Community College
14500 Twelve Mile Road
Warren, Michigan

Dear Ed:

I presented your letter of request regarding your doctoral dissertation sample of instructors and students to the provosts of our four campuses at Oakland Community College during the last President's Staff Meeting. After thorough discussion of the matter, it was agreed that you should be permitted to contact those faculty members and students who would qualify for inclusion in the sample which you seek.

Under the circumstances of a multi-campus community college, I should like to suggest that you proceed by contacting faculty members whom you know in the science departments on each of the respective campuses of the College. Each of the faculty members that you contact could then help you reach the students who would qualify for inclusion in that aspect of your sample.

If this office can be of any further help to you in these matters, please feel free to contact me at your earliest convenience. Best wishes for success in your doctoral endeavor.

Sincerely,

"Joe"

Joseph E. Hill
President

JEH/sp

MACOMB COUNTY
COMMUNITY COLLEGE

SOUTH CAMPUS
14500 TWELVE MILE ROAD
WARREN, MICHIGAN 48093
(313) 779-7000

September 10, 1973

Dear Friend,

As a part of the requirements of my doctor of philosophy degree at Ohio State University I am conducting a survey of faculty and students at several Michigan community colleges. I wish to sample their opinions about collective bargaining as it is practiced by college faculty unions and the effect which it may have upon the classroom. I wish to include your opinions in the survey.

Would you be so kind as to fill out the enclosed opinionnaire today and return it to me in the enclosed self-addressed, stamped envelope. Without your cooperation it will be more difficult to get a fair sample of student opinions.

Please sit and answer it now, or tonight, and place it in the mail to me tomorrow. If I do not receive your response quickly I will take an inordinate amount of time to complete the remainder of the study, as my time is strictly monitored.

Thank you for your cooperation.

Sincerely yours,

Ed Arnfield

Edwin A. Arnfield
Biology Department

MACOMB COUNTY
COMMUNITY COLLEGE

SOUTH CAMPUS
14500 TWELVE MILE ROAD
WARREN, MICHIGAN 48093
(313) 779-7000

November 1, 1973

Dear Friend,

As a part of the requirements of my doctor of philosophy degree at Ohio State University I am conducting a survey of faculty and students at several Michigan community colleges. I wish to sample their opinions about collective bargaining as it is practiced by college faculty unions and the effect which it may have upon the classroom. I wish to include your opinions in the survey.

Would you be so kind as to fill out the enclosed opinionnaire today and return it to me in the enclosed self-addressed, stamped envelope. Without your cooperation it will be more difficult to get a fair sample of student opinions.

Please sit and answer it now, or tonight, and place it in the mail to me as soon as possible. Your cooperation in completing and returning this opinionnaire will enable me to complete the remainder of the study quickly.

Thank you for your cooperation.

Sincerely yours,

Edwin A. Arnfield

Edwin A. Arnfield
Biology Department

EAA/vc

Dear Friend:

About 10 days ago, I sent you an opinionnaire about collective bargaining and asked if you would fill it out and return it to me. Your opinions are important to the study. Won't you please take the time to complete the opinionnaire and place it in the mail?

Thank you.

Edwin A. Arnfield
Research & Development
Macomb County Community College
14500 12 Mile Rd.
Warren, Mich. 48093

MACOMB COUNTY
COMMUNITY COLLEGE

SOUTH CAMPUS
14500 TWELVE MILE ROAD
WARREN, MICHIGAN 48093
(313) 7200

December 7, 1973

Dear Friend,

Several weeks ago I sent you a questionnaire and asked you to return it to me in the enclosed self-addressed, stamped envelope. The questionnaire is a part of the requirements of my doctor of philosophy degree at Ohio State University. I am conducting a survey of faculty and students at several Michigan community colleges. I wish to sample their opinions about collective bargaining as it is practiced by college faculty unions and the effect which it may have upon the classroom. I wish to include your opinions in the survey.

Without your comments, it will be more difficult to get a fair sample of student opinions. I know it is an imposition on your time; however, without your cooperation, I cannot hope to complete the study.

Please sit and answer it now, or tonight, and place it in the mail to me soon. Your cooperation in completing and returning this opinnaire will enable me to complete the remainder of the study quickly.

Thank you for your cooperation.

Sincerely yours,

Edwin A. Arnfield

Edwin A. Arnfield
Biology Department

EAA/vc

APPENDIX C

FACULTY INTERVIEW QUESTIONS

FACULTY INTERVIEW QUESTIONS

1. Did you feel that collective bargaining (impasse) affected your
   a) teaching?
   b) classroom climate?
   c) what you taught?
   d) how you taught?
   e) the way in which you related to students?

2. Was there a sense of tension in the class that semester?

3. Did discussion of the impasse ever come up in class? Who initiated that discussion: you or students?

4. Did you do anything in the classroom to compensate for the climate of the impasse?

APPENDIX D

IBM CARD CODING KEY

COLLECTIVE BARGAINING OPINIONNAIRE
PILOT STUDY - VARIABLES AND CODINGS

#	Variable	Code	Col.	Card
1	WHEN ASKED: FRAME OF REFERENCE	XPFACTO=1, NOW=2	1	1
2	YRS SINCE H SCH GRAD'N		4-5	"
3	DRAFT ELIGIBLE?	Y=1, NO=0	6	"
4	SEX	M=1, F=2	7	"
5	FULL-TIME OR PART-TIME STUDENT	FT=1, PT=0	8	"
6	VETERAN	Y=1, NO=0	9	"
7	CONTINUE STUDY BEYOND C/C?	Y=1, NO=0	10	"
8	TRANSFER TO 4 YR SCHOOL?	Y=1, NO=0	11	"
9	SCIENCE MAJOR?	Y=1, NO=0	12	"
10	ABILITY AS GENERAL STUDENT	A=4, B=3, C=2, D=1, 0	13	"
11	ABILITY AS SCIENCE STUDENT	A=4, B=3, C=2, D=1, 0	14	"
12	C/B EFFECT WAY FAC PARTICIP COND EMPLYMT	SA=1 THRU SD=5	15	"
13	C/B EFFECTIVE WAY LIMIT UNILAT AUTH BD		16	"
14	FAC MEMB SHLD BE ABLE W/HOLD SERV		17	"
15	C/B SHLD OMIT THREAT W/HOLD SERV	R = SCORING REV'S'D	18	"
16	FAC MEMB SHLD BE FREE ORG/BARG COLLEC		19	"
17	FAC ORGS SHLD PUB UNFAIR PRAC		20	"
18	C/B PRIM COERCIVE TECH W/DET EFF HI ED	R	21	"
19	STRIKES UNDESIR ASPECT C/B	R	22	"
20	MILITANT FAC - MALCONTENTS & MISFITS	R	23	"
21	FAC MEMBS SHLD NOT STRIKE ENFORCE DEM'DS	R	24	"
22	GOOD FAC CAN ALWAYS GET SALARY W/O CB	R	25	"
23	C/B BENEATH DIGNITY COL FAC	R	26	"
24	STRIKES, SANCT, ... IMPROPER FOR COL FAC	R	27	"
25	FAC MEMB C/NOT W/HOLD SERV W/O VIOLATE ETHICS	R	28	"
26	C/B INFRINGE'M'T ON AUTHOR OF BD	R	29	"
27	C/B GOOD WAY UNITE PROF'N		30	"
28	C/NEGOT AGREE PLACE UN/DESIR RESTR ON ADM	R	31	"
29	C/B PROVIDE GREATER ON JOB DGNTY		32	"
30	C/B LEADERS ARE POWER SEEKERS...	R	33	"

#	Variable	Code	Col.	Card
31	LOCAL FAC ORG SHLD SEEK REG STDS HIRING		34	1
32	FAC HAVE RIGHT IMPOSE SANCTIONS		35	"
33	SANCT STEP TWD FAC RESP SELF-DISCIPL		36	"
34	SANCT MEANS IMPRO ED OPPORT...		37	"
35	CENSURE LEGIT TECH FOR FAC USE	SA=1 THRU SD=5	38	"
36	POS THAT FAC MAY NOT STRIKE - BEST INT HI ED	R	39	"
37	SERV FAC NOT SO NEC TO WELFARE AS FORFEIT RIGHT STRIKE		40	"
38	ANY FAC SANCTION UNPROF'L	R	41	"
39	UNWISE TO ESTAB EDUCN'L POL THRU C/B	R	42	"
40	WHEN GOV BD DENIES, FAC HAS RT TAKE PUBLIC		43	"
41	C/B BRING GREATER ORDER/SYSTEM EDUC'N		44	"
42	C/B SCALE SUM TOTAL	1x30=30 TO 5x30=150 RANGE 30-150	45-47	"
43	C/BARGAINING	FORCED CHOICE	48-49	"
44	EXCESSIVE ABSENCE	RANKING OF	50-51	"
45	PERSONAL ILLNESS	1-11	52-53	"
46	WARS		54-55	"
47	ELECTIONS - NAT'L POLITICS		56-57	"
48	POOR INSTRUCTOR		58-59	"
49	FAMILY ILLNESS		60-61	"
50	DOLLAR CRISIS		62-63	"
51	EMOTIONAL PROBLEM		64-65	"
52	BARGAINING IMPASSE		66-67	"
53	ADMINISTRATIVE HARRASSMENT		68-69	"
54	LARGE/SMALL	1=AGREE	4	2
55	GOOD/BAD	THRU	5	"
56	STRONG/WEAK	7=DISAGREE	6	"
57	FAST/SLOW		7	"
58	VALUABLE/WORTHLESS		8	"
59	NICE/AWFUL		9	"
60	FAIR/UNFAIR		10	"
61	ACTIVE/PASSIVE		11	"
62	FOSTERING OPENMINDEDNESS: TOTAL	1x8=8 TO 7x8=56 RANGE 8 THRU 56	12-13	" "

#	Variable	Code	Col.	Card
63	F/U		14	2
64	V/W		15	"
65	A/D		16	"
66	N/A		17	"
67	S/W		18	"
68	L/S		19	"
69	F/S		20	"
70	G/B		21	"
71	VALUING LOGICAL REASON'G: TOTAL	RANGE: 8-56	22-23	"
72	L/S		24	"
73	G/B		25	"
74	F/U		26	"
75	S/W		27	"
76	A/P		28	"
77	N/A		29	"
78	F/S		30	"
79	V/W		31	"
80	REJECTION MYTH/SUPERSTITION: TOTAL	RANGE: 8-56	32-33	"
81	S/W		34	"
82	F/S		35	"
83	N/A		36	"
84	V/U		37	"
85	L/S		38	"
86	F/U		39	"
87	G/B		40	"
88	A/P		41	"
89	BARGAINING IMPASSE: TOTAL	RANGE: 8-56	42-43	"
90	G/B		44	"
91	L/S		45	"
92	S/W		46	"
93	N/A		47	"
94	A/P		48	"
95	F/S		49	"
96	F/U		50	"
97	V/W		51	"
98	SCIENTIFIC ATTITUDES: TOTAL	RANGE: 8-56	52-53	"
99	G/B		54	"
100	A/P		55	"
101	N/A		56	"
102	L/S		57	"
103	F/U		58	"

#	Variable	Code	Col.	Card
104	F/S		59	2
105	V/W		60	"
106	S/W		61	"
107	INTERACTION OF SCI & ARTS: TOTAL	RANGE: 8-56	62-63	"
108	S/W		64	"
109	A/P		65	"
110	G/B		66	"
111	F/S		67	"
112	N/A		68	"
113	V/W		69	"
114	F/U		70	"
115	L/S		71	"
116	USE OF SANCTIONS IN BARGAINING: TOTAL	RANGE: 8-56	72-73	"
117	F/U		44	"
118	A/P		55	"
119	S/W		66	"
120	N/A		77	"
121	F/S		88	"
122	V/W		99	"
123	G/B		10	"
124	L/S		11	"
125	SCIENCE: TOTAL	RANGE: 8-56	12-13	"
126	L/S		14	"
127	S/W		15	"
128	N/A		16	"
129	F/S		17	"
130	V/W		18	"
131	G/B		19	"
132	A/P		20	"
133	F/U		21	"
134	SCIENTIFIC LITERACY: TOTAL	RANGE: 8-56	22-23	"
135	A/P		24	"
136	G/B		25	"
137	F/S		26	"
138	V/W		27	"
139	S/W		28	"
140	L/S		29	"
141	N/A		30	"
142	F/U		31	"
143	METHODS/PROCEDURES SCIENCE: TOTAL	RANGE: 8-56	32-33	"

#	Variable	Code	Col.	Card
144	S/W		34	3
145	F/U		35	"
146	L/S		36	"
147	A/P		37	"
148	V/W		38	"
149	N/A		39	"
150	G/B		40	"
151	F/S		41	"
152	APPRECIATION LIMIT'NS SCIENCE: TOTAL	RANGE: 8-56	42-43	"
153	S/W		44	"
154	N/A		45	"
155	F/S		46	"
156	L/S		47	"
157	V/W		48	"
158	G/B		49	"
159	F/U		50	"
160	----------OMISSION ERROR	---------------	51	"
161	SCIENCE AS BASIC PART MOD LIV'G: TOTAL	RANGE: 7-49	52-53	"
162	L/S		54	"
163	G/B		55	"
164	A/P		56	"
165	S/W		57	"
166	F/S		58	"
167	V/W		59	"
168	N/A		60	"
169	F/U		61	"
170	USE OF STRIKES BY TCH'RS: TOTAL	RANGE: 8-56	62-63	"
171	WOULD YOU ANSWER DIFFERENTLY?	Y=1, NO=0	79	"

COLLECTIVE BARGAINING OPINIONNAIRE
MAJOR STUDY - VARIABLES AND CODINGS

V#	Variable	Code	Col.	Card
1	INSTITUTION ATTENDED	1=MAC, 2=OAK'D	1	1
2	WHEN ANSWERED (FRAME OF REF)	1=XPF, 2=NOW	2	"
	INSTRUCTOR NUMBER	INSTR #1-15	3-4	"
3	WHEN Q'AIRRE RET'D	1=1ST.Q,2=1ST.REM 3=2ND.Q,4=2ND.REM	11	"
4	YRS SINCE H SCH GRAD'N		12-13	"
	DRAFT ELIGIBLE	1=Y, 0=NO	14	"
5	SEX	1=M, 2=F	15	"
6	F/T OR P/T STUDENT	1=F, 0=PT	16	"
7	VETERAN	1=Y, 0=NO	17	"
8	EDUC'N BEYOND C/C?	1=Y, 0=NO	18	"
9	ATTEND 4 YR SCH?	1=Y, 0=NO	19	"
10	SCI MAJOR?	1=Y, 0=NO	20	"
	RATE AS STUDENT	4=A, 3=B, 2=C, 1=D, 0=ALL OTH.	21	"
	SCIENCE ABILITY	4=A, 3=B, 2=C, ETC.	22	"
11	RECORDED GRADE IN BIOL	4=A, 3=B, 2=C, ETC.	23	"
	# YRS TAUGHT BIOL	01	24-25	"
	# YRS AT THIS COLLEGE	01	26-27	"
	F/T OR P/T INSTRUCTOR	1=F/T, 0=P/T	28	"
	DEGREE	1=BA, 2=MA, 3=+30, 4=PHD.	29	"
	FAC ORGANIZ MEMBER	1=Y, 0=NO	30	"
	GRADE ON DISTRIB'N CURVE?	1=Y, 0=NO	31	"
12	(1) C/B EFFECT WHY FAC PARTICIP COND EMPLYM'T	SA=1,	32	"
13	(2) C/B EFFECT WAY LIMIT UNILAT AUTH BD	THRU SD=5	33	"
14	(3) FAC SHLD BE ABLE W/HOLD SERV	SA1 SD5	34	"
15	(4) C/B SHLD OMIT THREAT W/HOLD SERV	" "	35	"
16	(5) FAC MEMBS SHLD BE FREE ORGANIZ & BARG	" "	36	"
17	(6) FAC ORGS SHLD PUB U/FAIR PRACTS	" "	37	"
18	(7) C/B PRIMARILY COERCIVE TECHNIQUE	" "	38	"

V#	Variable	Code		Col.	Card
19	(8) STRIKES U/DESIR ASPECT C/B	SA1	SD5	39	1
20	(9) MILITANT FAC: MALCONT & MISFITS	"	"	40	"
21	(10) FAC MEMB SHLD NOT STRIKE ENFORCE DEM'DS	"	"	41	"
22	(11) GOOD FAC CAN ALWAYS GET SAL.....	"	"	42	"
23	(12) C/B BENEATH DIG COL FAC	"	"	43	"
24	(13) STRIKES, ... IMPROP COL FAC	"	"	44	"
25	(14) FAC MEMBS CANNOT W/HOLD SERV W/O VIOLATE PROF ETH	"	"	45	"
26	(15) C/B INFRINGE AUTHOR OF ED	"	"	46	"
27	(16) C/B GOOD WAY UNITE PROF'N	"	"	47	"
28	(17) C/NEGOT'D AGREE PLACE UNDES RESTRICT ON ADMIN	"	"	48	"
29	(18) C/B PROVIDES GREATER ON JOB DIGNITY	"	"	49	"
30	(19) C/B LEADERS: POWER SEEKERS	"	"	50	"
31	(20) LOCAL FAC SHLD SEEK REGUL STDS HIRING	"	"	51	"
32	(21) FAC HAVE RT IMPOSE SANCT'S	"	"	52	"
33	(22) SANCT STEP T'WARD FAC RESPONS FOR SELF-DISCIPLINE	"	"	53	"
34	(23) SANCTS MEANS IMPROV EDUCN'L OPPORT....	"	"	54	"
35	(24) CENSURE LEGIT TECH - FAC USE	"	"	55	"
36	(25) POSIT'N FAC MAY NOT STRIKE IN BEST INTR HI EDUC'N	"	"	56	"
37	(26) SERV OF FAC NOT SO NECESS AS FORFEIT RT STRIKE	"	"	57	"
38	(27) ANY FACULTY SANCT'N UNPROF	"	"	58	"
39	(28) UNWISE ESTAB ED POLICY THRU C/B	"	"	59	"
40	(29) WHEN GOV BD DENIES FAC HAS RT TAKE TO PUBLIC	"	"	60	"
41	(30) C/B BRING GREATER ORDER & SYSTEM TO EDUC'N	"	"	61	"

V#	Variable	Code	Col.	Card
42	(TOT) C/B SCALE CUMULATIVE TOTAL	RANGE: 1x30=30 THRU 5x30=150	62-64	1
43	WOULD YOU ANSWER DIFF?	1=Y, 0=NO.	65	"
	IF YES, MORE/LESS FAVORABLY?	1=MORE, 0=LESS	66	"
	ACADEMIC COMPETNT	RANKING OF 1-8	67	"
	GOOD ST/TCHR RELAT	"	68	"
	MATLS ADAPTED TO ST ABILS	"	69	"
	WELL ORGZ'D LEC & LABS	"	70	"
	ADEQ LNG MATERIALS	"	71	"
	CLEAR ASSIGNM'TS & EXPECT'NS	"	72	"
	INTEREST'G LECS & LABS	"	73	"
	POS ATTITUDE ABOUT TCHG BIOL	"	74	"
	ACAD COMPETENT	RANKING OF 1-8	11	2
	GOOD ST/ TCHR RELAT	"	12	"
	MATLS ADAPT TO ST ABIL	"	13	"
	WELL ORG'ZD LECS & LABS	"	14	"
	ADEQ LEARNING MATERIALS	"	15	"
	CLEAR ASSIGNMNTS & EXPECT'NS	"	16	"
	INTEREST'G LECS & LABS	"	17	"
	POS ATTITUDE ABOUT TCHG BIOL	"	18	"
44	COL BARG'G	RANKING OF 1-8	19	"
	EXCESS'V ABSENCE	"	20	"
	FOREIGN WARS	"	21	"
	NATIONAL POLITICS	"	22	"
	POOR INSTRUCTION/POOR STUDENT GROUP	"	23	"
	ILLNESS	"	24	"
	EMOTIONAL PROBLEM	"	25	"
45	BARGAINING IMPASSE	"	26	"
46	FOSTERING OPENMINDEDNESS	1=AGREE TO 7=DISAGREE		
	LG/SM	"	27	"
	GD/BAD	"	28	"
	PA/ACTIVE	"	29	"
	WK/STRONG	"	30	"
	FA/SLOW	"	31	"
	WL/VALUABLE	"	32	"
	NI/AWFUL	"	33	"
	UNF/FAIR	"	34	"
	FOSTER OPENMINDEDNESS - TOTAL	8x1=8 POS. 8x7=56 NEG.	35-36	"

V#	Variable	Code	Col.	Card
	VAL LOG REASON'G	1=AGREE TO 7=DISAGREE		
	FA/UNF	"	37	2
	VAL/WORTHLESS	"	38	"
	ACTIVE/PASSIVE	"	39	"
	NICE/AWFUL	"	40	"
	ST/WEAK	"	41	"
	SM/LARGE	"	42	"
	SLOW/FAST	"	43	"
	GD/BAD	"	44	"
47	VALUING LOGICAL REASON'G: TOTAL	8x1=8. POS., 8x7=56 NEG.	45-46	"
	REJECT MYTH.....			
	LG/SM		47	"
	GD.BAD		48	"
	UNF/FAST		49	"
	WK/STRONG		50	"
	AD/PASSIVE		51	"
	AWF/NICE		52	"
	SLO/FAST		53	"
	VAL/WORTHLESS		54	"
48	REJECTION OF MYTH & SUPERSTITION: TOTAL	8x1=3 POS 8x7=56=NEG	55-56	"
	BARGAINING IMPASSE:			
	ST/WEAK		57	"
	FA/SLOW		58	"
	AWF/NICE		59	"
	VAL/WORTHLESS		60	"
	SM/LARGE		61	"
	UNF/FAST		62	"
	GD/BAD		63	"
	PA/ACTIVE		64	"
49	BARGAINING IMPASSE: TOTAL	8x1=8 POS. TO 8x7=56 NEG.	65-66	"
	SCI ATTITUDES:	1=AGREE TO 7=DISAGREE		
	BAD/GD		67	"
	LG/SM		68	"
	WK/STR		69	"
	NI/AWF		70	"

V#	Variable	Code	Col.	Card
	ACT/PA		71	2
	FA/SLO		72	"
	INF/FA		73	"
	WL/VAL		74	"
50	SCIENTIFIC ATTITUDES: TOTAL	8x1=8 POS		
		8x7=56 NEG.	75-76	2
	INTERACT SCI & ARTS	1=AGREE TO 7=DISAGREE		
	GD/BAD		11	3
	ACT/PASSIVE		12	"
	AWF/NICE		13	"
	SM/LG		14	"
	FA/UNFAIR		15	"
	FA/SLOW		16	"
	WL/VALUABLE		17	"
	WK/STRONG		18	"
51	INTERACTION OF SCIENCE & THE ARTS: TOTAL	8x1=8 POS. TO		
		8x7=56 NEG	19-20	"
	USE SANCTIONS BARGAINING	1=AGREE TO 7=DISAGREE		
	WK/STR		21	"
	PA/ACT		22	"
	GD/BAD		23	"
	FA/SLO		24	"
	NI/AWF		25	"
	WL/VAL		26	"
	FA/UNF		27	"
	LG/SM		28	"
52	USE OF SANCTIONS IN BARGAINING:			"
	TOTAL	8x1=8 POS. TO		
		8x7=56 NEG.	29-30	"
	SCIENCE:	1=AGREE TO 7=DISAGREE		
	UNF/FA		31	"
	PA/ACT		32	"
	ST/WK		33	"
	NI/AWF		34	"
	SLO/FA		35	"
	VAL/WL		36	"
	BAD/GD		37	"
	LG/SMA		38	"
53	SCIENCE: TOTAL	8x1=8 POS TO		
		8x7=56 NEG.	39-40	"

V#	Variable	Code	Col.	Card
	SCI LITERACY:	1=AGREE TO 7=DISAGREE	41	
	LG/SM		41	3
	STR/WK		42	"
	AWF/NI		43	"
	SLO/FA		44	"
	WL/VAL		45	"
	GD/BAD		46	"
	PA/ACT		47	"
	UNF/FA		48	"
54	SCIENTIFIC LITERACY: TOTAL	8x1=8 POS TO 8x7=56 NEG.	49-50	"
	METH & PROC SCI:	1=AGREE TO 7=DISAGREE		
	ACT/PA		51	"
	BAD/GD		52	"
	SLO/FA		53	"
	VAL/WL		54	"
	STR/WK		55	"
	SM/LG		56	"
	NI/AWF		57	"
	FA/UNF		58	"
55	METHODS & PROCEDURES OF SCIENCE: TOTAL	8x1=8 POS TO 8x7=56 NEG.	59-60	"
	APPREC LIM OF SCI:	1=AGREE TO 7=DISAGREE		
	WK/STR		61	"
	FA/UNF		62	"
	SM/LG		63	"
	AC/PA		64	"
	W:/VAL		65	"
	AWF/NI		66	"
	BAD/GD		67	"
	FA/SLO		68	"
56	APPRECIATION OF THE LIMITATIONS OF SCIENCE: TOTAL	8x1=8 POS. TO 8x7=56 NEG	69-70	"
	SCI AS BASIC PT MOD LIV'G	1=AGREE TO 7=DISAGREE		
	PA/ACT		11	4
	WK/STR		12	"
	AWF/NI		13	"

V#	Variable	Code	Col.	Card
	FA/SLO		14	4
	LG/SM		15	"
	VAL/WL		16	"
	GD/BAD		17	"
	FA/UNF		18	"
57	SCIENCE AS A BASIC PART OF MODERN LIVING: TOTAL	8x1=8 POS. TO 8x7 = 56 NEG.	19-20	"
	USE OF STRIKES BY TCHRS:	1=AGREE TO 7=DISAGREE		
	LG/SMA		21	"
	GD/BAD		22	"
	PA/ACT		23	"
	WK/STR		24	"
	FA/SLO		25	"
	WL/VAL		26	"
	NI/AWF		27	"
	UNF/FA		28	"
58	USE OF STRIKES BY TEACHERS: TOTAL	8x1=8 POS TO 8x7=56 NEG.	29-30	"
59	IMPACT INDEX	6 PLACE DECIMAL	16-23	5

APPENDIX E

EXTRA TABLES

TABLE 67

STUDENT ATTITUDE TOWARD COLLECTIVE BARGAINING
MULTIVARIATE ANALYSIS OF COVARIANCE
TEST OF EQUALITY OF REGRESSION

Test of equality of regression in all cells

Multivariate tests of significance using Wilks lambda criterion

Test of roots	F	DFHYP	DFERR	P less than	R
1 through 3	0.645	12.000	950.116	0.805	0.114
2 through 3	0.496	6.000	719.000	0.812	0.087
3 through 3	0.108	2.000	360.000	0.898	0.024

Univariate F tests

Variable	F(3,362)	Mean Sq	P less than
Collective Bargaining Total Score	0.772	142.197	0.510
Bargaining Impasse	1.309	151.529	0.271
Use of Sanctions in Bargaining	0.602	68.335	0.614
Use of Strikes by Teachers	0.357	45.889	0.784

TABLE 68

STUDENT ATTITUDES TOWARD FOUR AFFECTIVE COURSE GOALS IN BIOLOGY
MULTIVARIATE ANALYSIS OF COVARIANCE
TEST OF EQUALITY OF REGRESSION

Test of Equality of Regression in all cells

Multivariate tests of significance using Wilks lambda criterion

Test of roots	F	DFHYP	DFERR	P less than	R
1 through 4	1.273	24.000	1243.146	0.170	0.192
2 through 4	1.126	15.000	1184.168	0.328	0.170
3 through 4	0.795	8.000	1092.236	0.608	0.114
4 through 4	0.550	3.000	946.679	0.649	0.068

Univariate F tests

Variable	F(6,359)	Mean Sq.	P less than
Fostering Openmindedness	1.874	113.475	0.084
Valuing Logical Reasoning	1.723	84.312	0.115
Rejection of Myth &Superstition	1.092	118.060	0.366
Appreciation Limitations of Science	1.468	156.004	0.188

TABLE 69

STUDENT ATTITUDES TOWARD SIX AFFECTIVE COURSE GOALS IN BIOLOGY
MULTIVARIATE ANALYSIS OF COVARIANCE
TEST OF EQUALITY OF REGRESSION

Test of equality of regression in all cells

Multivariate tests of significance using Wilks Lambda criterion.

Test of roots	F	DFHYP	DFERR	P less than	R
1 through 6	1.208	36.000	1535.326	0.186	0.237
2 through 6	0.914	25.000	1400.500	0.586	0.196
3 through 6	0.566	16.000	1222.726	0.910	0.143
4 through 6	0.199	9.000	992.106	0.994	0.066
5 through 6	0.065	4.000	702.000	0.992	0.027
6 through 6	0.000	1.000	351.500	1.000	0.001

Univariate F-tests

Variable	F(6,354)	Mean Sq.	P less than
Scientific Attitudes	0.208	14.703	0.974
Interaction of Science & Arts	1.799	160.126	0.098
Science	1.358	85.250	0.231
Scientific Literacy	0.993	77.220	0.430
Methods Procedures of Science	0.823	66.559	0.553
Science Basic Part Modern Living	0.415	31.961	0.869

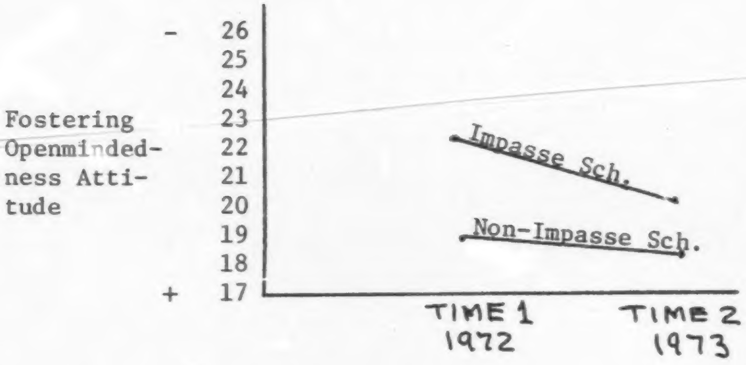

Figure 5. Graphic Representation of Impasse by Time Perspective Interaction for Fostering Openmindedness Attitude.

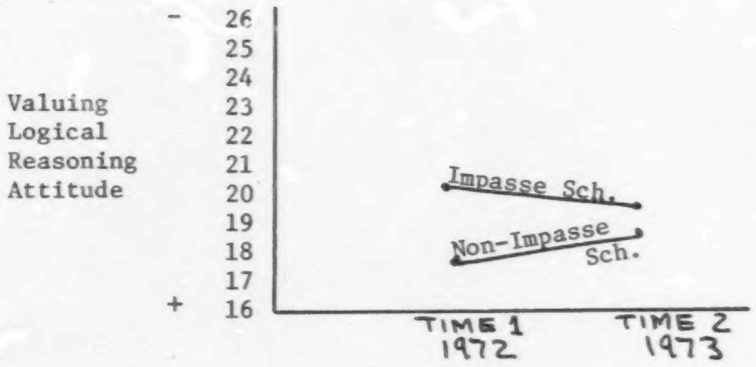

Figure 6. Graphic Representation of Impasse by Time Perspective Interaction for Valuing Logical Reasoning Attitude.

BIBLIOGRAPHY

Agreement Between the Board of Trustees of the Community College District of Macomb and Macomb County Community College Faculty Organization. Warren, Michigan: Macomb County Community College, 1972.

Aiken, Lewis R., and Aiken, Dorothy R. "Recent Research on Attitudes Concerning Science," Science Education, LIII, n. 4 (October, 1969), pp. 295-305.

Andrews, Richard, and Becker, Leslie. "Children Speak," Childhood Education, CLVIII (April, 1969), p. 8.

A Program for Teaching Science. The Thirty-First Yearbook of the National Society for the Study of Education, Part I. Bloomington, Indiana: Public School Publishing Company, 1932.

Bakalis, Michael J. "Collective Negotiations in the Absence of Legislation," Compact, VI, n. 3 (June, 1972), pp. 18-20.

Balzer, LeVon, Evans, Thomas, and Blosser, Patricia. A Review of Research on Teacher Education. Columbus, Ohio: Association for Education of Teachers of Science, ERIC, SMEAC, 1973.

Belcher, A. Lee. "The NLRB Ruling: How it Affects Campus Administration," College and University Business, IL (August, 1970), pp. 42-45.

Bennion, John W. "The Curriculum Administrator and Negotiations," Educational Leadership, XXVI, n. 4 (January, 1969), pp. 347-50.

Bernstein, Merton C. "Alternatives to the Strike," AAUP Bulletin, LVII, n. 4 (December, 1972), pp. 404-12.

Best, John W. Research in Education. 2nd ed. Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1970.

Blazier, Richard. "Proposals for General Biology in the Community College," American Biology Teacher, XXXIII, n. 4 (April, 1971), pp. 228-31.

Blendinger, Jack Glenn. "Attitudes of Secondary School Students in the State of Michigan Who Have Experienced Strikes." Unpublished Doctoral dissertation, Colorado State College, 1969.

Blendinger, J. "Teacher Activism," The Clearing House, XLIV, n. 5 (January, 1970), pp. 268-71.

Bloom, Benjamin S., ed. Taxonomy of Educational Objectives. Handbook I - Cognitive Domain. New York: David McKay Company, Inc., 1956.

Boggs, John R., and Herrscher, Barton R. A Developmental Plan for Junior College Remedial Education. Number 2: Attitude Assessment. Los Angeles, California: ERIC Clearinghouse for Junior College Information, Graduate School of Education and University Library, University of California at Los Angeles, 1968.

Bogue, Jesse Parker. The Community College. New York: McGraw-Hill Book Company, Inc., 1950.

Bruner, Jerome S. On Knowing. Essays for the Left Hand. Cambridge, Massachusetts: Belknap Press, 1964.

Bruner, Ken August. "Historical Development of the Junior College Philosophy," Junior College Journal, XL, n. 7 (April, 1970), pp. 30-34.

Butler, John E. Establishing Goals for Scientific Literacy, A Conference Report. Jacksonville, Florida: National Science Teachers Association, November 17-18, 1967.

Bureau of the Census. County and City Data Book. Washington, D.C.: U. S. Government Printing Office, 1972.

Campbell, Donald T. and Stanley, Julian C. Experimental and Quasi-Experimental Designs for Research, Chicago, Illinois: Rand-McNally and Company, 1963.

Carlton, Patrick William. "Attitudes of Certificated Instructional Personnel in North Carolina Toward Questions Concerning Collective Negotiations and Sanctions." Unpublished Doctoral dissertation, University of North Carolina, 1966.

Catalog, 1973-74. Bloomfield Hills, Michigan: Oakland Community College, 1973.

Civil Rights Survey of Fall, 1973. Warren, Michigan: Macomb County Community College, 1973.

Clyde, Dean J. Multivariate Analysis of Variance on Large Computers. Miami, Florida: Clyde Computing Services, 1969.

Cooley, W. W. and Becker, J. J. "The Junior College Student," Personnel and Guidance Journal, LXV, n. 5 (January, 1966), pp. 464-69.

_______________, and Reed, Jr., H. B., "The Measurement of Science Interests: An Operational and Multidimensional Approach," Science Education, XLV (1961), pp. 320-27.

Cote, William E. "MSU Faculty Reject Unions." Change, V. n. 1 (February, 1973), pp. 28-30.

Cox, Donald D. "Goals of Biological Education," Bioscience, XXI, n. 23 (December, 1971), p. 1172.

Crawfurd, Allan. "A Short History of the Public Community Junior College Movement in the United States," Paedagogica Historica, X, n. 1 (1970), pp. 28-48.

Creager, Joan G., and Ehrle, Elwood B., "Some Attributes of Two-Year-College Biologists," American Biology Teacher, XXXIII, n. 3 (March, 1971), pp. 163-64.

Creal, Richard Charles. "A Study of the Factors Which Influence the Course of Negotiation Toward Resolution or Impasse in Selected Michigan Community Colleges," Unpublished Doctoral dissertation, University of Michigan, 1969.

Cross, K. Patricia. The Junior College Student: A Research Description. Princeton, New Jersey: Educational Testing Service, 1968.

Diederich, Paul B. "Components of the Scientific Attitude," in Anderson, Hans O. Readings in Science Education for the Secondary School. New York: MacMillan Company, 1969.

Dixon, W. J., ed. BMD Biomedical Computer Programs. Berkeley, California: University of California Press, 1973.

Duryea, E. D. and Fisk, Robert S., "Higher Education and Collective Bargaining." Compact, VI, n. 3 (June, 1972), pp. 42-43.

Dutton, W. H. and Stephens, Lois. "Measuring Attitudes Toward Science," School Science and Mathematics, LXII, 1963, pp. 43-49.

Eells, Walter C. The Junior College. Cambridge, Massachusetts: Houghton-Mifflin Company, 1931.

Eiss, Albert F., ed. Science Education in the Junior College. Problems and Practices. A Report of Four Conferences on Junior College Science Teaching. Commission on the Education of Teachers of Science of the NSTA. Washington, D. C.: National Science Teachers Association, 1967

______________, and Harbeck, Mary Blatt. Behavioral Objectives in the Affective Domain. Washington, D. C.: National Science Supervisors Association, 1969.

Ellish, Arthur D. "The Effects of Attitudes on Academic Achievement," Junior College Journal, XXXIX, n. 6 (March, 1969), pp. 120-22.

Etzioni, Amitai. "Universities: Strike, Strike, Strike?" Educational Record, LI, n. 3 (Summer, 1970), pp. 219-21.

Evans, Thomas P. "Scientific Literacy: Whose Responsibility?" American Biology Teacher, XXXIII, n. 2 (February, 1970), pp. 80-84.

Fibel, Lewis R. "The Science Teacher in the Junior College: A National Register," Junior College Journal, XLIX, n. 8 (May, 1969), pp. 42-43.

Fields, Ralph R. The Community College Movement. New York: McGraw-Hill Book Company, Inc., 1962.

Fink, Russel F. "Some Criteria for Establishment of Community Colleges with Special Reference to Michigan." Unpublished Doctoral dissertation, Michigan State University, 1952.

Fox, David J. The Research Process in Education. New York: Holt, Rinehart and Winston, Inc., 1969.

Franklin, Clyde W. and Li, W. L. "Faculty Attitudes Toward Activism: A Causal Analysis." Sociology and Social Research, LVI (June, 1972), pp. 421-32.

Fretwell, Elbert K. Founding Public Junior Colleges. New York: Bureau of Publications, Teachers College, Columbia University, 1954.

Fryburg, Estelle L. "Children's Attitudes During the New York City School Strike of 1968," School and Society, XCVIII (November, 1970), pp. 429-33.

Gunstream, Stanley E. "The Two-Year-College Biologist and His Academic Environment," American Biology Teacher, XXXIII, n. 4 (April, 1971), pp. 226-28.

Haney, Richard E. "The Development of Scientific Attitudes," in Victor, Edward, and Lerner, Marjorie S. Science Education for the Elementary School. New York: MacMillan Company, 1971.

Hanke, John. "Student Values, Attitudes and Perceptions," Colorado Journal of Educational Research, X, n. 2 (Winter, 1971), pp. 23-26.

Harrington, Charles, and Madler, Norman. "New York City's Strike: Effect on Political Socialization of School-age Boys," Annual Meeting Paper. Society for Applied Anthropology, Mexico City, D. F., Mexico, 1969.

Harvard Committee. General Education in a Free Society. Cambridge, Massachusetts: Harvard University Press, 1945.

Howe, Ray. "A View From the Bridge," Compact, VI, n. 3 (June, 1972), pp. 21-23.

______________. "The Bloody Business of Bargaining," College and University Business, XLVIII, n. 3 (March, 1970), pp. 63-67.

Hoyt, C. "Test Reliability Established by Analysis of Variance," Psychometrika, VI, 1941, pp. 153-60.

Hurlburt, Evelyn M. "Goals of the Task Force of Two-Year-College Biologists," American Biology Teacher, XXXIII, n. 3 (March, 1971), pp. 161-62, 166.

Junior College Directory. Washington, D. C.: American Association of Junior Colleges, 1961.

Karre, Frederick H. "Articulation of Transfer Students: The Iowa Experience," American Biology Teacher, XXXIV, n. 9 (December, 1972), pp. 530-31, 537.

Kimball, Merritt E. "Understanding the Nature of Science: A Comparison of Scientists and Science Teachers," Journal of Research in Science Teaching, V (1967-68), pp. 110-20.

Koerner, Thomas. "What to Do When the Bargaining Goes Sour," American School Board Journal, CLVII, n. 2 (August, 1969), pp. 21-22.

______________, and Parker, Clyde. "How to Play for Keeps at the Bargaining Table," Compact, VI, n. 3 (June, 1972), pp. 16-17.

Kormondy, Edward J. "Recommendations on Science in the Two-Year College," Bioscience, XXI, n. 17 (September, 1971a), pp. 909-11.

______________. "CUEBS and the College Biology Teacher," Journal of College Science Teaching, I, n. 1 (October, 1971b), p. 23.

Krathwohl, David R., Bloom, Benjamin S., and Masia, Bertram B. Taxonomy of Educational Objectives. The Classification of Educational Goals. Handbook II: Affective Domain. New York: David McKay Company, Inc., 1956.

Lester, Seelig, and Risikoff, Rose. "Children and the School Strike," Childhood Education, XLV, n. 8 (April, 1969), pp. 450-53.

Lieberman, Myron. "Faculty Senates: Institutionalized Irresponsibility," Phi Delta Kappan, LI, n. 1 (September, 1969a), pp. 16-20.

_______________. "Representational Systems in Higher Education." Employment Relations in Higher Education. Bloomington, Indiana: Phi Delta Kappa, Inc., 1969b.

Lingenfelter, George Edwin. "An Analysis of Student Teacher Attitude Modifications Toward Collective Negotiations and Sense of Power During Their Student Teaching Experience." Unpublished Doctoral dissertation, Pennsylvania State University, 1971.

Lytle, James H., and Yanoff, Jay M. "The Effects (If Any) of a Teacher Strike on Student Achievement," Phi Delta Kappan, LIV (December, 1973). p. 270.

Malamud, Phyllis. "Faculty: Labor or Management?" Compact, VI, n. 3 (June, 1972), pp. 46-48.

Mason, Herbert J. "Community College Programs in the Life Sciences," American Biology Teacher, XXXIII, n. 3 (March, 1961), pp. 165-66.

McFadden, Dennis N. A Self-Appraisal Instrument. Project D: Appraising Teacher Performance. Columbus, Ohio: School Management Institute and Battelle Memorial Institute, 1970

McHugh, William F. "Collective Negotiations in Public Higher Education," College and University Business, XLVII, n. 6 (December, 1969), pp. 41-44, 61-62.

Medsker, L. L. and Trent, J. W. Factors Affecting College Attendance of High School Graduates from Varying Socio-economic and Ability Levels. USOE Cooperative Research Project No. 438. Berkeley, California: Center for Research and Development in Higher Education, University of California, 1965.

Moore, John W. Pennsylvania Community College Faculty: Attitudes Toward Collective Negotiations. University Park, Pennsylvania: Center for the Study of Higher Education, Pennsylvania State University, 1971.

_______________. "The Attitudes of Pennsylvania Community College Faculty Toward Collective Negotiations in Relation to their Sense of Power and Sense of Mobility." Unpublished Doctoral dissertation, Pennsylvania State University, 1970.

Neal, Richard G. "The Impact of Collective Bargaining on Education," Compact, VI, n. 3 (June, 1972), pp. 9-12.

Neidt, Charles O., and Hedlund, Dalva E. "Longitudinal Relationships Between Congitive and Affective Learning Outcomes," Journal of Experimental Psychology, XXXVIII, n. 3 (Spring, 1969), pp. 56-60.

Nolte, Chester M. "Next Finger in the Collective Bargaining Pie May Be On a Federal Hand," American School Board Journal, CLVI, n. 8 (February, 1969), pp. 24-25.

Office of Education. Biennial Survey of Education in the United States, 1954-56. Washington, D. C.: U. S. Government Printing Office, 1958.

Ohio State Lantern. XCII, n. 1 (June 19, 1973), Columbus, Ohio: The Ohio State University.

Osgood, Charles E., Suci, George J., and Tannenbaum, Percy H. The Measurement of Meaning. Urbana, Illinois: University of Illinois Press, 1965.

Ostrander, Kenneth. H. "A Study of the Scalability of Selected Attitude Items Related to Collective Action by Teachers." Unpublished Doctoral dissertation, University of Tennessee, 1968.

______________. "Measurement of Teacher Attitudes Toward Sanction Activities," The Journal of Educational Research, LXIII, n. 5 (January, 1970), pp. 219-21.

Ostrom, Thomas M. "The Relationship Between the Affective, Behavioral and Cognitive Components of Attitude," Journal of Experimental Social Psychology, V, n. 1 (January, 1969), pp. 12-30.

Perry, Charles R. Collective Action By Public School Teachers. Vol. III. Impasse Resolution in Teacher Negotiations. Chicago, Illinois: University of Chicago, 1968.

Perry, Richard. "Achieving a Meeting of the Minds," Today's Education, LIX, n. 2 (February, 1970), pp. 34-35.

Polishook, Sheila Stern. "Collective Bargaining and the City University of New York," Journal of Higher Education, XLI, n. 5 (May, 1970), pp. 377-86.

"Recommendations of the Conference on Science in the Two-Year College," American Biology Teacher, XXXII, n. 1 (January, 1970).

Rehmus, Charles M., and Wilner, Evan. The Economic Results of Teacher Bargaining: Michigan's First Two Years. No. 6 of the Research Papers. Ann Arbor, Michigan: Institute of Labor and Industrial Relations, The University of Michigan, Wayne State University, 1968.

Rethinking Science Education. The Fifth-Ninth Yearbook of the National Society for the Study of Education, Part I. Chicago, Illinois: University of Chicago Press, 1960.

Rokeach, Milton. The Open and Closed Mind. New York: Basic Books, Inc., 1960.

______________. Beliefs, Attitudes and Values. San Francisco, Calif.: Jossey-Bass, Inc., 1970.

Rothman, Arthur I. "The Relationship Between Responses to Science Concepts on a Semantic Differential Instrument and Achievement in Freshman Physics and Chemistry." Unpublished Doctoral dissertation, State University of New York at Buffalo, 1968.

Roumell, George T., Jr. "Fact-Finding Can Unblock Bargaining Impasse," Nation's Schools, LXXXV, n. 3 (March, 1970), pp. 77-78.

Saunders, Robert L., and Lovell, John T. "Negotiations: Inevitable Consequence of Bureaucracy?" Educational Leadership, XXVI, n. 4 (January, 1969), pp. 351-54.

Schoenfeldt, L. F. "Post High School Education," in Flanagan, J. C., and Cooley, W. W. Project Talent: One Year Follow Up Studies. USOE Cooperative Research Project No. 2333. Pittsburgh, Pennsylvania: School of Education, University of Pittsburgh, 1966.

Schwirian, Patricia, and Thomson, Barbara, "Changing Attitudes Toward Science: Undergraduates in 1967 and 1971," Journal of Research in Science Teaching. IX, n. 3 (1972), pp. 253-59.

Science Education in American Schools. The Forty-Sixth Yearbook of the National Society for the Study of Education, Part I. Chicago, Illinois: University of Chicago Press, 1947.

Shaw, Marvin E., and Wright, Jack M. Scales for the Measurement of Attitudes. New York: McGraw-Hill Book Company, 1967.

South Campus Academic Bulletin, 1973-74. Warren, Michigan: Macomb County Community College, 1973.

Starr, Robert J. "A Study of the Use of 'Invitations to Enquiry' and Student Attitude," Journal of Research in Science Teaching, IX, n. 3 (1972), pp. 247-51.

Staudohar, Paul D. "Fact-Finding for Settlement of Teacher Labor Disputes," Phi Delta Kappan, LI, n. 8 (April, 1970), pp. 422-25.

Stiles, William E., and Robran, Edward L. "Dealing With Impasse," Today's Education, LVIII, n. 1 (January, 1969), pp. 57-58.

Stoops, John A., ed. The Community College in Higher Education. Bethlehem, Pennsylvania: Lehigh University, 1966.

Student Enrollment Report: Fall, 1973. 1.7.39. Warren, Michigan: Macomb County Community College, 1973.

Survey of Higher Education in Michigan. The Community College in Michigan: Staff Study No. 1. Lansing, Michigan: State of Michigan Department of Education, 1957.

Swanson, Nadine Speer. "Attitudes of Children and Parents Toward the Los Angeles Teachers' Strike, April-May, 1970." Unpublished Doctoral dissertation, Brigham Young University, 1972.

"Teacher Strikes, 1960-61 to 1969-70," NEA Research Bulletin, XLVIII, n. 3 (October, 1970), pp. 69-72.

Thurstone, L. L. and Chave, E. J. The Measurement of Attitude. Chicago, Illinois: University of Chicago Press, 1929.

Veblen, Thorstein. Higher Learning in America. New York: B. W. Huebsch, 1918.

Vidmar, Neil, and McGrath, Joseph E. "Forces Affecting Success in Negotiation Groups," Behavioral Science, XV, n. 2 (March, 1970), pp. 154-63.

Williams, Richard C. "An Academic Alternative to Collective Negotiations." Phi Delta Kappan, XLIX, n. 10 (June, 1968), pp. 571-74.

Young, William F. "Curriculum Negotiations: Present Status: Future Trends," Educational Leadership, XXVI, n. 4 (January, 1969), pp. 341-43.